

x610 Series Layer 3 Stackable Gigabit Ethernet Switches

**x610-24Ts
x610-24Ts/X
x610-48Ts
x610-48Ts/X
x610-24Ts-POE+
x610-24Ts/X-POE+
x610-48Ts-POE+
x610-48Ts/X-POE+**

Installation Guide

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Electrical Safety and Emissions Standards

This product meets the following standards.

U.S. Federal Communications Commission

Radiated Energy

Note: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Note: Modifications or changes not expressly approved of by the manufacturer or the FCC, can void your right to operate this equipment.

Industry Canada

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

RFI Emissions	FCC Class A, EN55022 Class A, EN61000-3-2, EN61000-3-3, VCCI Class A, C-TICK, CE
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Warning

In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.


EMC (Immunity)	EN55024
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Electrical Safety	EN60950-1 (TUV), EN60825-1 (TUV), UL 60950-1 (CULUS), CSA-C22-2 No. 60950-1 (CULUS)
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Laser Safety	EN60825
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Translated Safety Statements

Important: The  indicates that a translation of the safety statement is available in a PDF document “Translated Safety Statements” posted on the Allied Telesis website at www.alliedtelesis.com.

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Preface

This guide contains the installation instructions for the x610 Series Layer 3 Gigabit Ethernet Switches. This preface contains the following sections:

- ❑ “Product Documentation” on page 14
- ❑ “Starting a Management Session” on page 15
- ❑ “Safety Symbols Used in this Document” on page 16
- ❑ “Where to Find Web-based Guides” on page 17
- ❑ “Contacting Allied Telesis” on page 18

Product Documentation

For overview information about the software features of the *AlliedWare Plus Operating System Software* which runs on the x610 Series Switches, refer to:

- ❑ *AlliedWare Plus Operating System Software Reference Guide*
- ❑ *Virtual Chassis Stacking (VCS) How To Note*
- ❑ *AT-StackXG Stacking Module Installation Guide*



Starting a Management Session

For instructions that describe how to start a local management session on a x610 switch, refer to the “Powering on a Switch with a DC AT-PWR250 Power Supply Module” on page 95. For information that describes how to log onto the *AlliedWare Plus Operating System Software*, see the *AlliedWare Plus Operating System Software Reference Guide*.

Safety Symbols Used in this Document

This document uses the safety symbols defined in Table 1.

Table 1. Safety Symbols

Symbol	Meaning	Description
	Caution	Performing or omitting a specific action may result in equipment damage or loss of data.
	Warning	Performing or omitting a specific action may result in electrical shock.

Where to Find Web-based Guides

The installation and user guides for all Allied Telesis products are available in portable document format (PDF) on our web site at **www.alliedtelesis.com**. You can view the documents online or download them onto a local workstation or server.

Contacting Allied Telesis

This section provides Allied Telesis contact information for technical support as well as sales and corporate information.

Online Support

You can request technical support online by accessing the Allied Telesis Knowledge Base at **www.alliedtelesis.com/support** and selecting the “Read More” link under Knowledge Base. You can use the Knowledge Base to submit questions to our technical support staff and review answers to previously asked questions.

Email and Telephone Support

For Technical Support via email or telephone, refer to the Support section of the Allied Telesis web site: **www.alliedtelesis.com**.

Warranty

For warranty information on the x610 Series Layer 3 Gigabit Ethernet Switches, go to **www.alliedtelesis.com/warranty** for the specific terms and conditions of the warranty and for warranty registration.

Returning Products

Products for return or repair must first be assigned a return materials authorization (RMA) number. A product sent to Allied Telesis without an RMA number will be returned to the sender at the sender’s expense. For instructions on how to obtain an RMA number, go to the Support section on our web site at **www.alliedtelesis.com**.

Sales or Corporate Information

You can contact Allied Telesis for sales or corporate information through our web site at **www.alliedtelesis.com**.

Management Software Updates

New releases of the management software for our managed products are available from the following Internet sites:

- ☐ Allied Telesis web site: **www.alliedtelesis.com**
- ☐ Allied Telesis FTP server: **<ftp://ftp.alliedtelesis.com>**

If the FTP server prompts you to log on, enter “anonymous” as the user name and your email address as the password.

Chapter 1

Overview

This chapter contains the following sections:

- ❑ “Introduction” on page 20
- ❑ “Switch Descriptions” on page 21
- ❑ “10/100/1000Base-T Ports” on page 29
- ❑ “SFP and SFP+ Transceiver Slots” on page 31
- ❑ “Combo Ports” on page 33
- ❑ “SD Card Slot” on page 35
- ❑ “Port LEDs” on page 36
- ❑ “System STATUS LEDs” on page 41
- ❑ “STACK LEDs” on page 43
- ❑ “Secure Digital (SD) LED” on page 45
- ❑ “Terminal Port” on page 46
- ❑ “Power Supplies” on page 47
- ❑ “Redundant Power Supplies” on page 49
- ❑ “AT-LBM (Loop Back) Module” on page 51
- ❑ “VCStack Stacking Module” on page 52
- ❑ “AC Power Connector” on page 53
- ❑ “Power Over Ethernet Plus (PoE+)” on page 54

Note

Do not begin the installation procedures in this guide until you have read the *AlliedWare Plus Operating System Software Release Notes* that are included with the latest release of the *AlliedWare Plus Operating System Software*.

Introduction

The x610 Series Switches are managed Gigabit Ethernet switches that can either act as standalone units or be integrated into a stacked configuration. There are eight Layer 3 switches in the series:

- ❑ x610-24Ts Switch
- ❑ x610-24Ts/X Switch
- ❑ x610-48Ts Switch
- ❑ x610-48Ts/X Switch
- ❑ x610-24Ts-POE+ Switch
- ❑ x610-24Ts/X-POE+ Switch
- ❑ x610-48Ts-POE+ Switch
- ❑ x610-48Ts/X-POE+ Switch

The *AlliedWare Plus Operating System Software* runs on all of the x610 switches.

For more detailed information about the switches, including illustrations, see “Switch Descriptions” on page 21.

Switch Descriptions

The following sections describe the x610 Series Layer 3 Gigabit Ethernet Switches.

x610-24Ts Switch

The x610-24Ts switch has the following hardware features:

- ❑ 24 10/100/1000Base-T ports
- ❑ Four Gigabit Ethernet small form-factor pluggable (SFP) transceiver slots
- ❑ An RJ-45 style serial terminal port for local (out-of-band) management
- ❑ One SD slot supporting SD and SDHC cards
- ❑ Status LEDs for the ports, transceiver slots, and system
- ❑ Redundant power supply connector
- ❑ Expansion slot for either an AT-StackXG or an AT-x6EM/XS2 stacking module
- ❑ Fixed 120 watts power supply

Figure 1 shows the x610-24Ts switch front and rear panels.

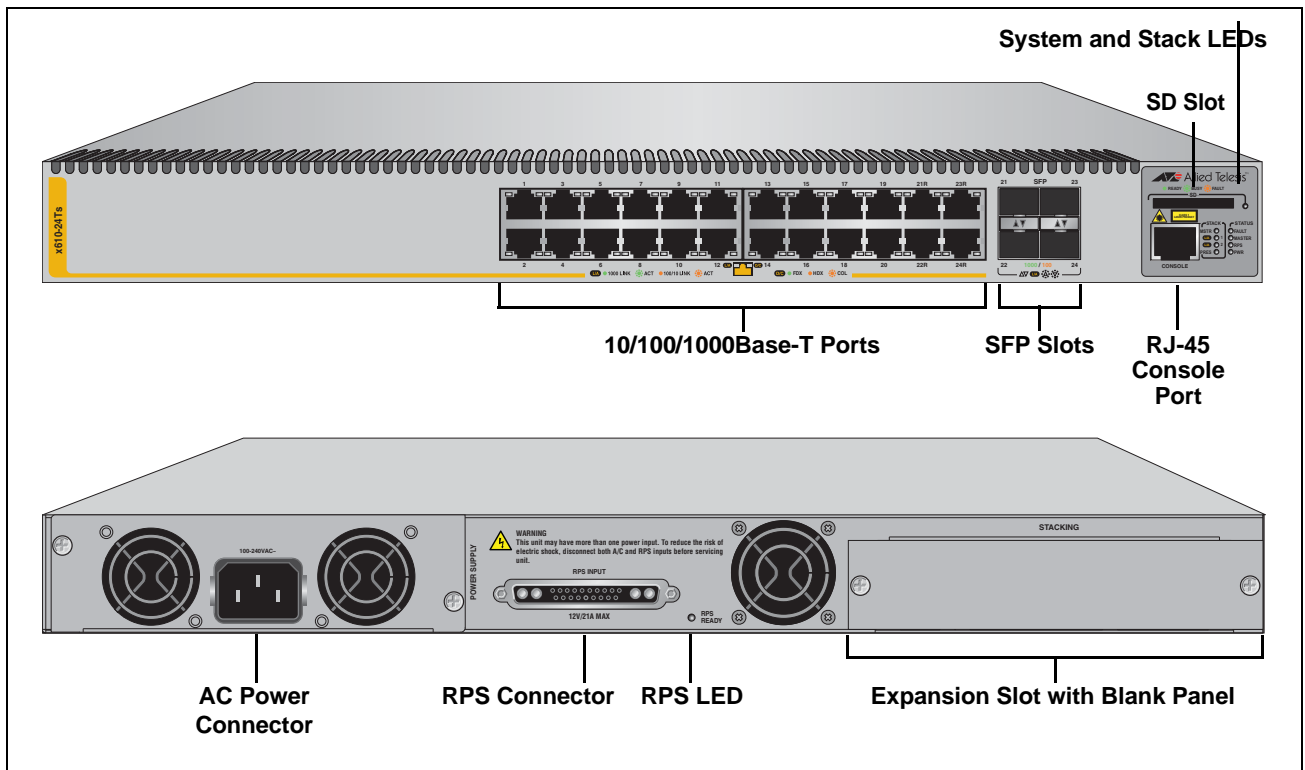


Figure 1. x610-24Ts Switch

x610-24Ts/X Switch

The x610-24Ts/X switch has the following hardware features:

- ❑ 24 10/100/1000Base-T ports
- ❑ Four Gigabit Ethernet small form-factor pluggable (SFP) transceiver slots
- ❑ Two 10 Gigabit Ethernet small form-factor pluggable plus (SFP+) transceiver slots
- ❑ An RJ-45 style serial terminal port for local (out-of-band) management
- ❑ One SD slot supporting SD and SDHC cards
- ❑ Status LEDs for the ports, transceiver slots, and system
- ❑ Redundant power supply connector
- ❑ Expansion slot for either an AT-StackXG or an AT-x6EM/XS2 stacking module
- ❑ Fixed 120 watts power supply

Figure 2 shows the x610-24Ts/X switch front and rear panel.

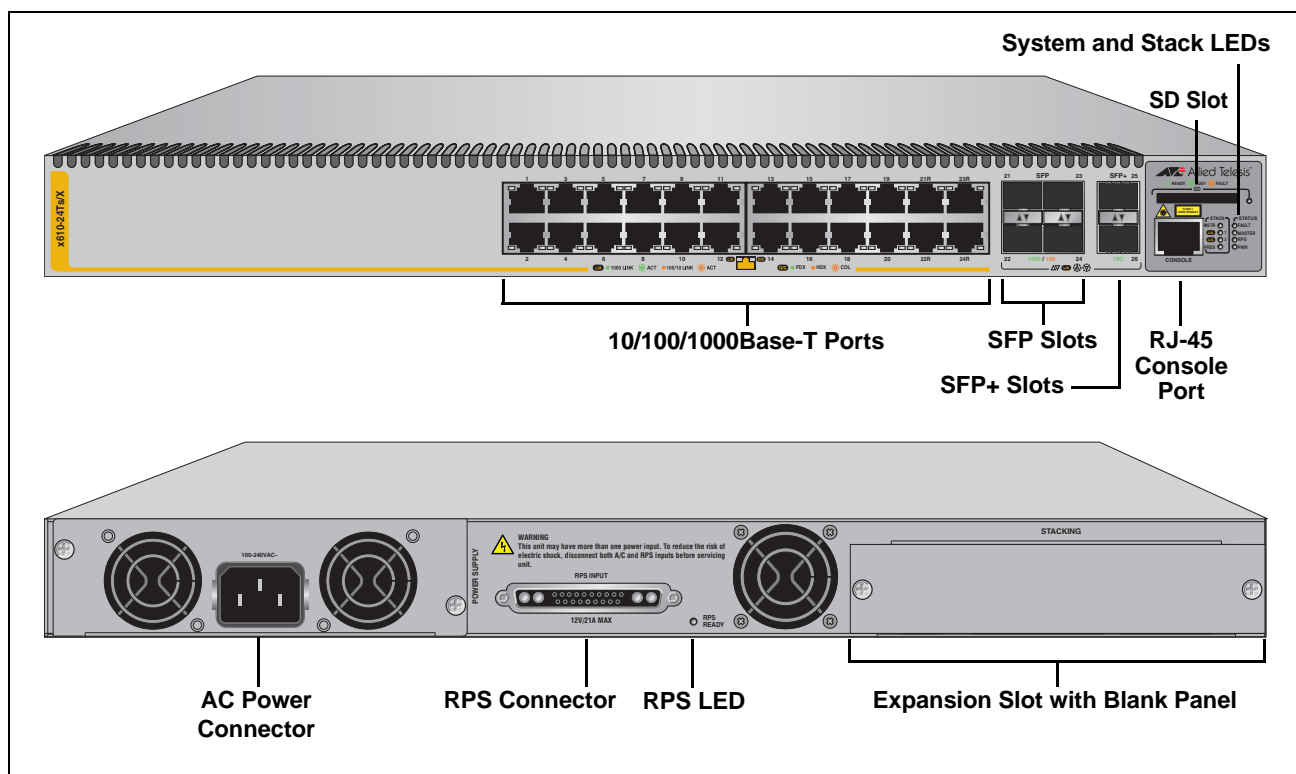


Figure 2. x610-24Ts/X Switch

x610-48Ts Switch

The x610-48Ts switch has the following hardware features:

- ❑ 48 10/100/1000Base-T ports
- ❑ Four Gigabit Ethernet small form-factor pluggable (SFP) transceiver slots
- ❑ An RJ-45 style serial terminal port for local (out-of-band) management
- ❑ One SD slot supporting SD and SDHC cards
- ❑ Status LEDs for the ports, transceiver slots, and system
- ❑ Redundant power supply connector
- ❑ Expansion slot for either an AT-StackXG or an AT-x6EM/XS2 stacking module
- ❑ Fixed 250 watts power supply

Figure 3 shows the x610-48Ts switch front and rear panel.

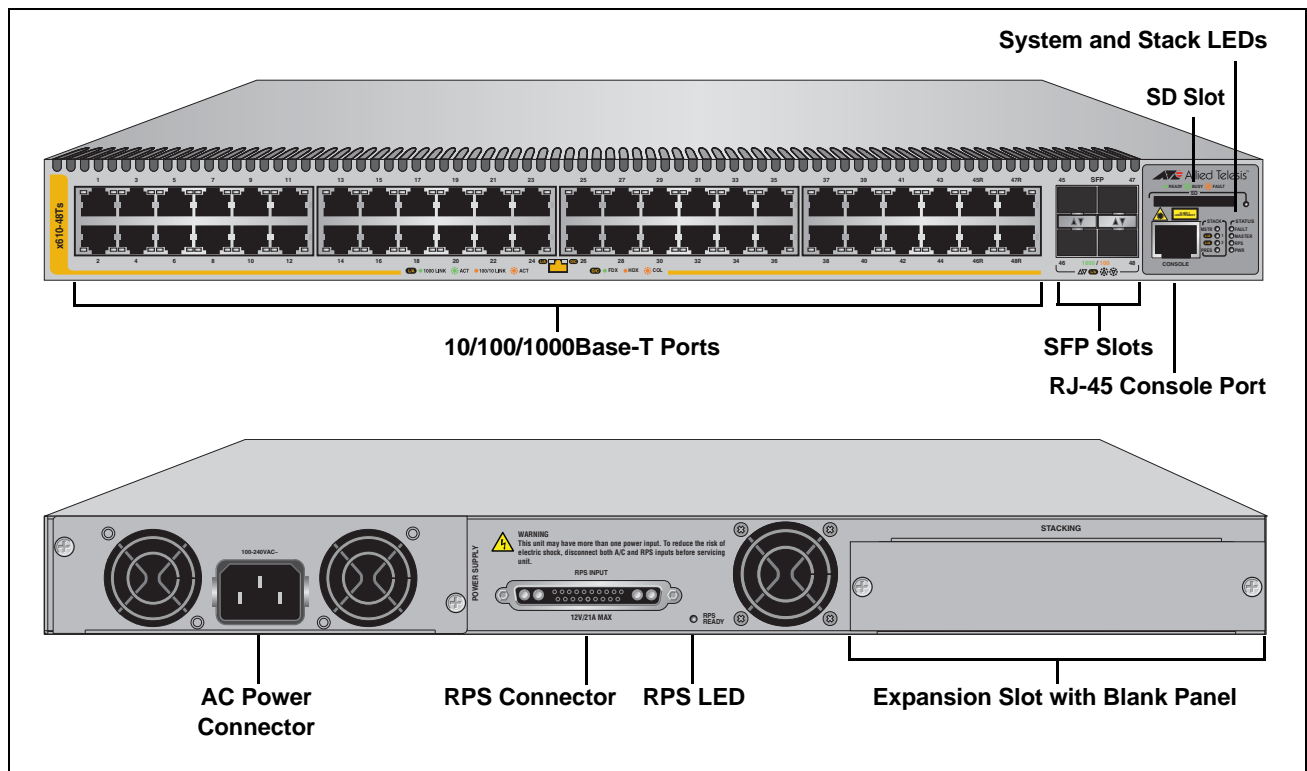


Figure 3. x610-48Ts Switch

x610-48Ts/X Switch

The x610-48Ts/X switch has the following hardware features:

- ❑ 48 10/100/1000Base-T ports
- ❑ Two Gigabit Ethernet small form-factor pluggable (SFP) transceiver slots
- ❑ Two 10 Gigabit Ethernet small form-factor pluggable plus (SFP+) transceiver slots
- ❑ An RJ-45 style serial terminal port for local (out-of-band) management
- ❑ One SD slot supporting SD and SDHC cards
- ❑ Status LEDs for the ports, transceiver slots, and system
- ❑ Redundant power supply connector
- ❑ Fixed 250 watts power supply
- ❑ AT-LBM (Loop Back) module installed in the rear of the switch

Figure 4 shows the x610-48Ts/X switch front and rear panel.

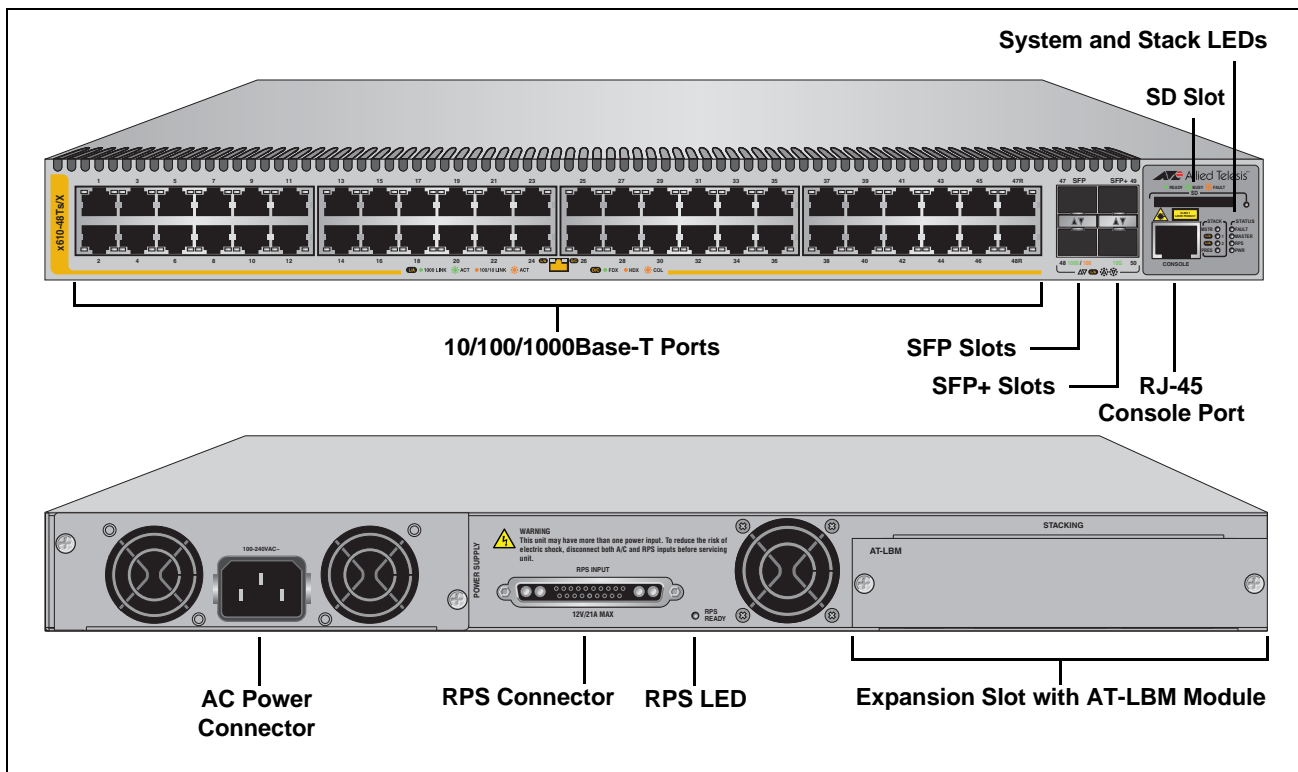


Figure 4. x610-48Ts/X Switch

x610-24Ts-POE+ Switch

The x610-24Ts-POE+ switch has the following hardware features:

- ❑ 24 10/100/1000Base-T ports with Power over Ethernet (PoE+) capability.
- ❑ Four Gigabit Ethernet small form-factor pluggable (SFP) transceiver slots
- ❑ An RJ-45 style serial terminal port for local (out-of-band) management
- ❑ One SD slot supporting SD and SDHC cards
- ❑ Status LEDs for the ports, transceiver slots, and system
- ❑ Redundant power supply connector
- ❑ Expansion slot for either an AT-StackXG or an AT-x6EM/XS2 stacking module

Figure 5 shows the x610-24Ts-POE+ switch front and rear panel.

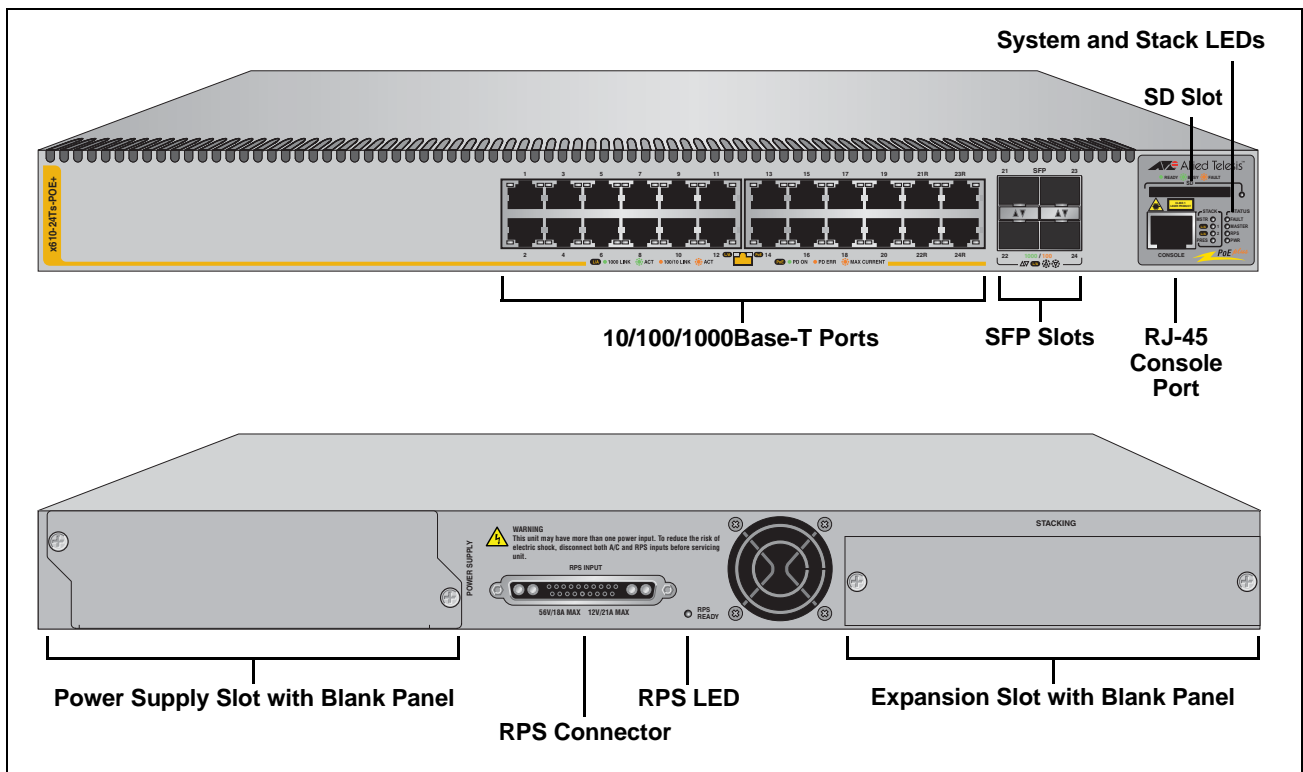


Figure 5. x610-24Ts-POE+ Switch

x610-24Ts/X-POE+ Switch

The x610-24Ts/X-POE+ switch has the following hardware features:

- ❑ 24 10/100/1000Base-T ports with Power over Ethernet Plus (PoE+) capability.
- ❑ Four Gigabit Ethernet small form-factor pluggable (SFP) transceiver slots
- ❑ Two 10 Gigabit Ethernet small form-factor pluggable plus (SFP+) transceiver slots
- ❑ An RJ-45 style serial terminal port for local (out-of-band) management
- ❑ One SD slot supporting SD and SDHC cards
- ❑ Status LEDs for the ports, transceiver slots, and system
- ❑ Redundant power supply connector
- ❑ Expansion slot for either an AT-StackXG or an AT-x6EM/XS2 stacking module

Figure 6 shows the x610-24Ts/X-POE+ switch front and rear panel.

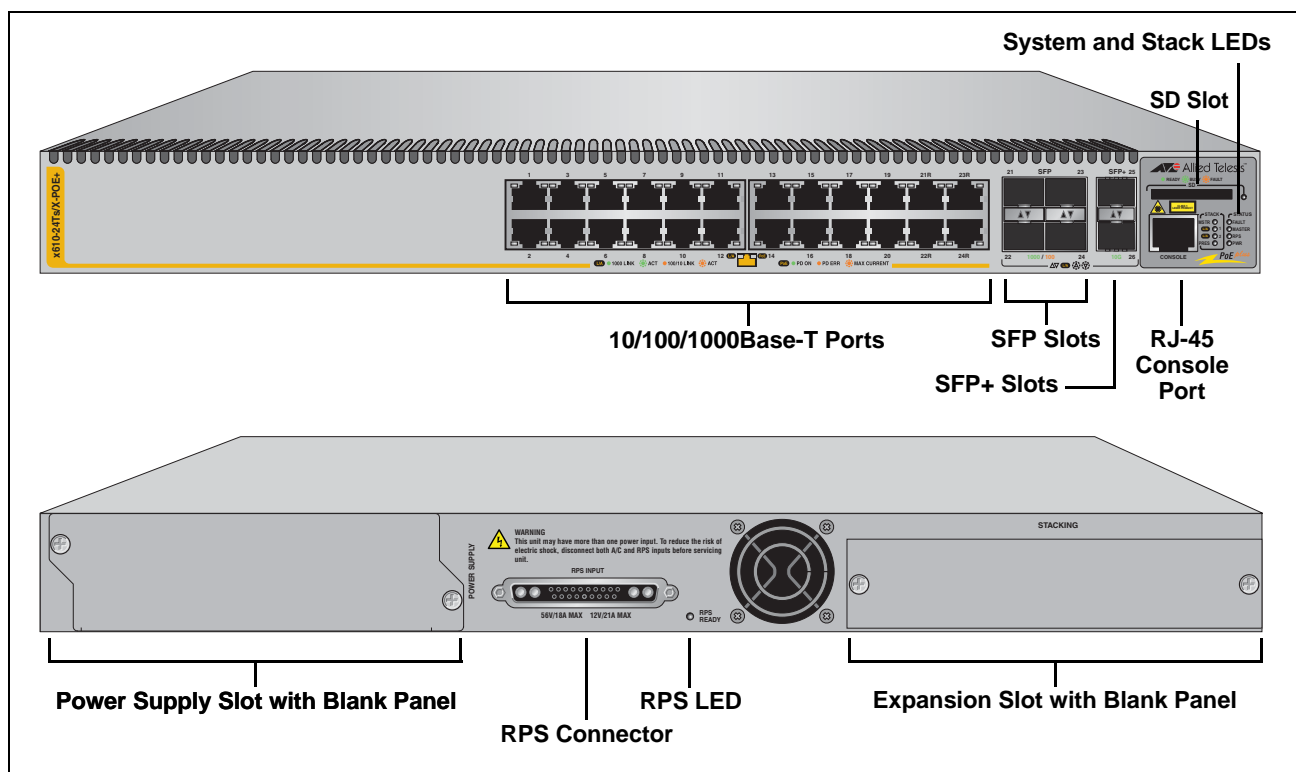


Figure 6. x610-24Ts/X-POE+ Switch

x610-48Ts-POE+ Switch

The x610-48Ts-POE+ switch has the following hardware features:

- ❑ 48 10/100/1000Base-T ports with Power over Ethernet (PoE+) capability.
- ❑ Four Gigabit Ethernet small form-factor pluggable (SFP) transceiver slots
- ❑ An RJ-45 style serial terminal port for local (out-of-band) management
- ❑ One SD slot supporting SD and SDHC cards
- ❑ Status LEDs for the ports, transceiver slots, and system
- ❑ Redundant power supply connector
- ❑ Expansion slot for either an AT-StackXG or an AT-x6EM/XS2 stacking module

Figure 7 shows the x610-48Ts-POE+ switch front and rear panel.

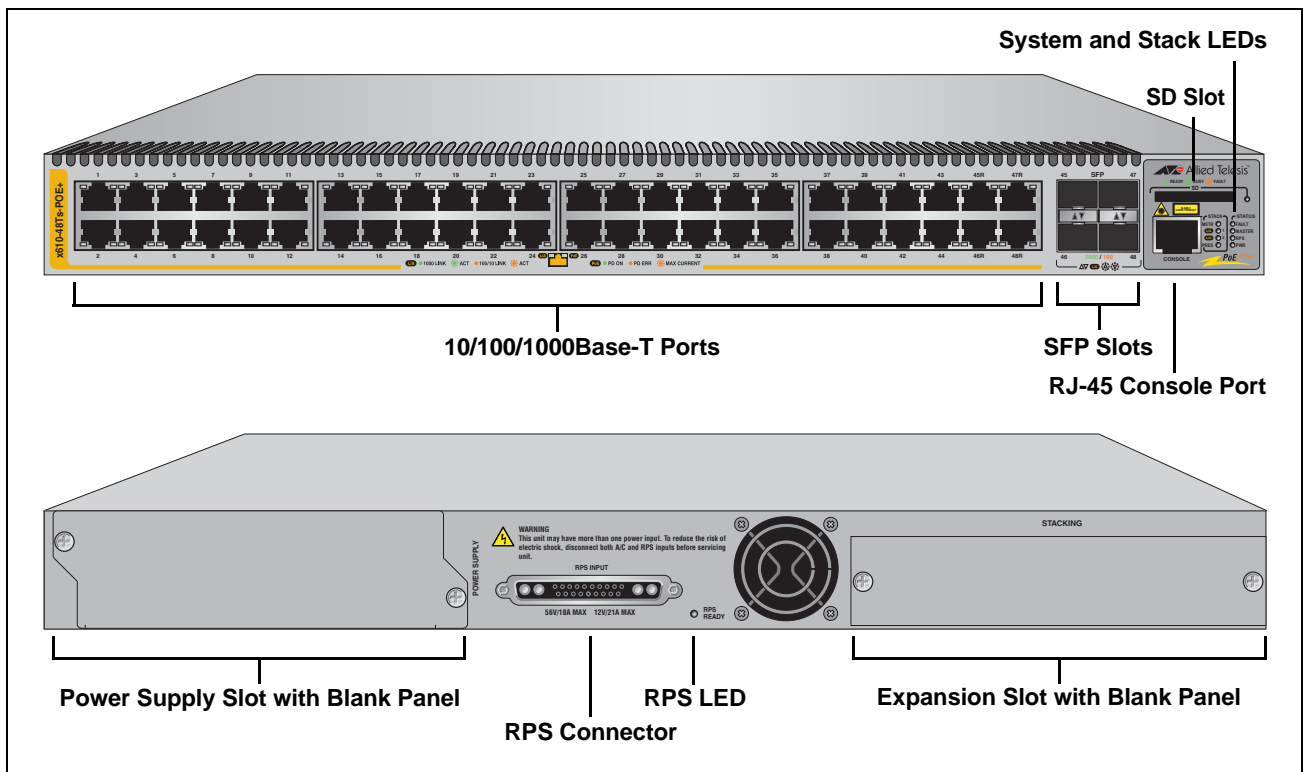


Figure 7. x610-48Ts-POE+ Switch

x610-48Ts/X-POE+ Switch

The x610-48Ts/X-POE+ switch has the following hardware features:

- ❑ 48 10/100/1000Base-T ports with Power over Ethernet Plus (PoE+) capability.
- ❑ Two Gigabit Ethernet small form-factor pluggable (SFP) transceiver slots
- ❑ Two 10 Gigabit Ethernet small form-factor pluggable plus (SFP+) transceiver slots
- ❑ An RJ-45 style serial terminal port for local (out-of-band) management
- ❑ One SD slot supporting SD and SDHC cards
- ❑ Status LEDs for the ports, transceiver slots, and system
- ❑ Redundant power supply connector
- ❑ AT-LBM (Loop Back) module installed in the rear of the switch

Figure 8 shows the x610-48Ts/X-POE+ switch front and rear panel.

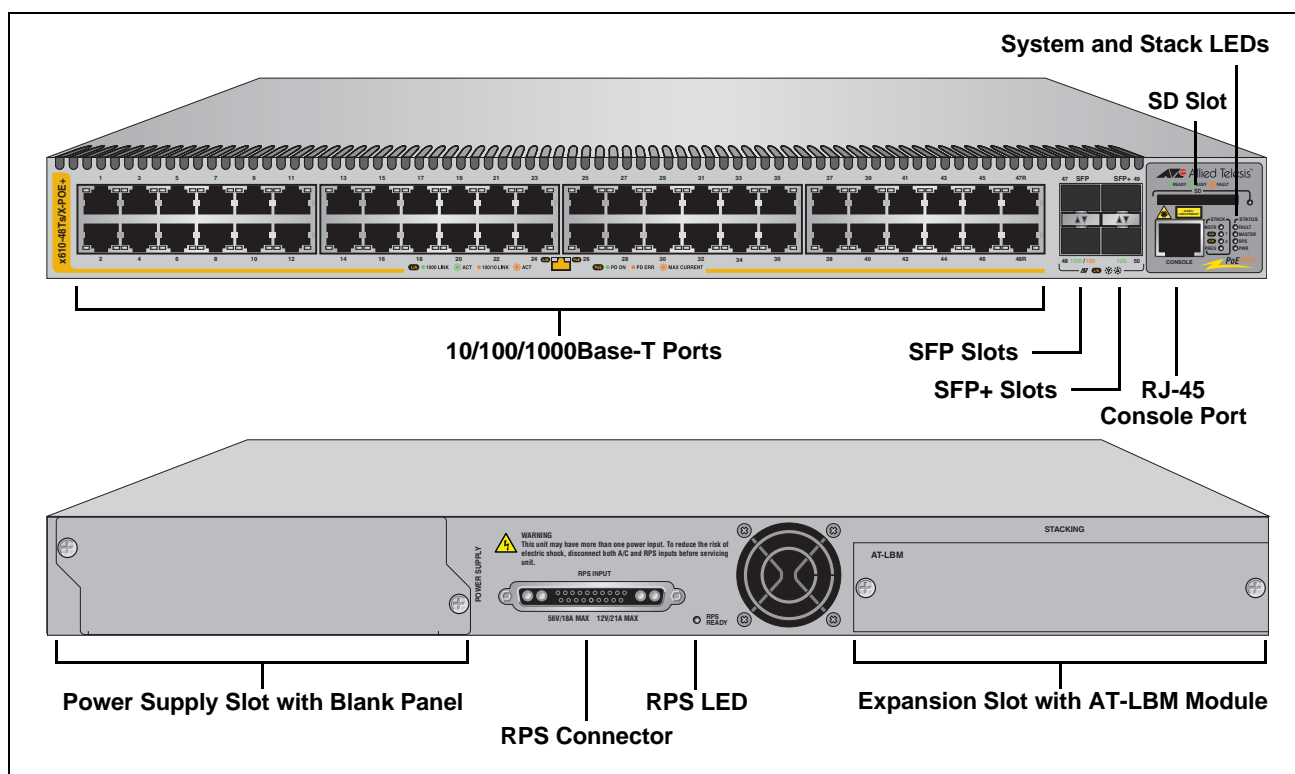


Figure 8. x610-48Ts/X-POE+ Switch

10/100/1000Base-T Ports

This section describes the 10/100/1000Base-T ports on the switches.

Connector Type The ports are 8-pin RJ-45 connectors that use four pins at 10 or 100 Mbps and all eight pins at 1000 Mbps. For the pin assignments, refer to “RJ-45 Twisted Pair Port Pinouts” on page 116.

Speed A port’s speed can be 10, 100, or 1000 Mbps. The speed can be set automatically through Auto-Negotiation, the default setting, or manually with the *AlliedWare Plus Operating System Software*.

Duplex Mode A 10/100/1000Base-T port can operate in either half- or full-duplex mode. (Full-duplex mode is the only mode available when a port is operating at 1000 Mbps.) The 10/100/1000Base-T ports are IEEE 802.3u-compliant and Auto-Negotiate the duplex mode setting.

You can disable Auto-Negotiation on the switch ports and set the duplex mode manually through the *AlliedWare Plus Operating System Software*.

Note

In order for a switch port to successfully Auto-Negotiate its duplex mode with a 10 or 100 Mbps end node, the end node must also be configured for Auto-Negotiation. Otherwise, a duplex mode mismatch can occur. A switch port using Auto-Negotiation defaults to half-duplex if it detects that the end node is not using Auto-Negotiation. This results in a mismatch if the end node is operating at a fixed duplex mode of full-duplex.

To avoid this problem when connecting an end node with a fixed duplex mode of full-duplex to a switch port, use the *AlliedWare Plus Operating System Software* to disable Auto-Negotiation on the port and set the port speed and duplex mode manually.

Please be aware that disabling Auto-Negotiation also disables Auto-MDI/MDIX. The port’s wiring configuration defaults to the MDI-X setting. This setting can be configured with the *AlliedWare Plus Operating System Software*.

Maximum Distance The ports have a maximum operating distance of 100 meters (328 feet).

Cable Type

The cabling requirements for a 10/100/1000Base-T port are:

- ❑ For 10 Mbps operation: Standard TIA/EIA 568-B-compliant Category 3 or better shielded or unshielded cabling with 100 ohm impedance and a frequency range that extends to 16 MHz.
- ❑ For 100 Mbps operation: Standard TIA/EIA 568-A-compliant Category 5 or TIA/EIA 568-B-compliant Enhanced Category 5 (Cat 5e) shielded or unshielded cabling with 100 ohm impedance and a frequency range that extends to 100 MHz.
- ❑ For 1000 Mbps operation: Standard TIA/EIA 568-A-compliant Category 5 or TIA/EIA 568-B-compliant Enhanced Category 5 (Cat 5e) shielded or unshielded cabling with 100 ohm impedance and a frequency range that extends to 100 MHz.

Auto-MDI/ MDI-X

The 10/100/1000Base-T ports on the switch are IEEE 802ab-compliant and feature auto-MDI/MDI-X. This feature, available when a port's speed and duplex mode are set through Auto-Negotiation, automatically configures a switch port to MDI or MDI-X depending on the wiring configuration of the port on the end node. This feature allows you to use a straight-through twisted pair cable when connecting any network device to a port on the switch.

Disabling Auto-Negotiation on a port and setting the speed and duplex mode manually also disables the auto-MDI/MDI-X feature. A port where Auto-Negotiation has been disabled defaults to MDI-X. Disabling Auto-Negotiation may require manually configuring a port's MDI/MDI-X setting or using a crossover cable.

Port Pinouts

The port pinout information is listed in Appendix A, Technical Specifications.

- ❑ When operating at 10 or 100 Mbps in the MDI configuration, refer to the specifications in Table 19 on page 116.
- ❑ When operating at 10 or 100 Mbps in the MDI-X configuration, refer to the specifications in Table 20 on page 116.
- ❑ When a 10/100/1000Base-T port operates at 1000 Mbps, refer to the specifications in Table 21 on page 117.

SFP and SFP+ Transceiver Slots

The x610 Series switches feature slots for optional Gigabit Ethernet SFP transceivers, as listed in Table 2. The SFP slots support both fiber optic and copper transceivers. Fiber optic transceivers let you connect the switches to other network devices over long distances using fiber optic cables. Copper transceivers allow you to add more twisted pair ports to your x610 Series switch.

The x610-24Ts/X, x610-24Ts/X-POE+, x610-48Ts/X, and x610-48Ts/X-POE+ switches feature additional slots for optional Gigabit Ethernet SFP+ transceivers, as listed in Table 2. The SFP+ slots support both fiber optic and copper 10 Gbps transceivers.

Table 2. Number of SFP and SFP+ Slots on x610 Series Switches

Model	SFP Slots	SFP+ Slots
x610-24Ts	4	-
x610-24Ts-POE+	4	-
x610-24Ts/X	4	2
x610-24Ts/X-POE+	4	2
x610-48Ts	4	-
x610-48Ts-POE+	4	-
x610-48Ts/X	2	2
x610-48Ts/X-POE+	2	2

Figure 9 shows a SFP/SFP+ transceiver.

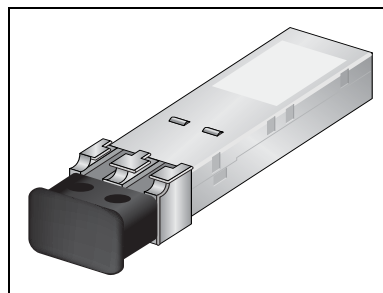


Figure 9. SFP/SFP+ Transceiver

Refer to “Installing SFP and SFP+ Transceivers” on page 92 for the SFP installation instructions.

Note

For a list of supported SFP and SFP+ transceivers, contact your Allied Telesis sales representative.

Combo Ports

On the 24 port x610 Series switches, the 10/100/1000Base-T ports 21R to 24R are paired with the four SFP slots to form four combo ports, as listed in Table 3.

Table 3. 10/100/1000Base-T Ports Matched with SFP Slots on 24 Port Switches

Ports and Slots
Port 21R with SFP slot 21
Port 22R with SFP slot 22
Port 23R with SFP slot 23
Port 24R with SFP slot 24

On the x610-48Ts and x610-48Ts-POE+ switches, the 10/100/1000Base-T ports 47R and 48R are paired with the four SFP slots to form four combo ports, as listed in Table 4.

Table 4. 10/100/1000Base-T Ports Matched with SFP Slots on x610-48Ts and x610-48Ts-POE+ Switches

Ports and Slots
Port 45R with SFP slot 45
Port 46R with SFP slot 46
Port 47R with SFP slot 47
Port 48R with SFP slot 48

On the x610-48Ts/X and x610-48Ts/X-POE+ switches, the 10/100/1000Base-T ports 47R and 48R are paired with the two SFP slots to form two combo ports, as listed in Table 5.

Table 5. 10/100/1000Base-T Ports Matched with SFP Slots on x610-48Ts/X and x610-48Ts/X-POE+ Switches

Ports and Slots
Port 47R with SFP slot 47
Port 48R with SFP slot 48

The 10/100/1000Base-T ports are identified with the letter “R” for “Redundant” as part of their number on the faceplate of the unit.

Follow these guidelines when using these ports and slots:

- ❑ Only one port in a pair, either a 10/100/1000Base-T port or a corresponding SFP module can be active at a time.
- ❑ A 10/100/1000Base-T port is the active port when its SFP slot is empty, or when an SFP module is installed but has not established a link to an end node.
- ❑ A 10/100/1000Base-T port automatically changes to the redundant status mode when an SFP module establishes a link with an end node.
- ❑ A 10/100/1000Base-T port automatically transitions back to the active status when the link is lost on an SFP module.
- ❑ In nearly all cases, a 10/100/1000Base-T port and an SFP module share the same configuration settings, including port settings, VLAN assignments, access control lists, and Spanning Tree Protocol settings.
- ❑ An exception to the shared settings is port speed. If you disable Auto-Negotiation on an 10/100/1000Base-T port and set the speed and duplex mode manually, the speed reverts to Auto-Negotiation when an SFP module establishes a link with an end node.
- ❑ The PoE+ power supplied from the 10/100/1000Base-T port is unaffected by insertion of an SFP module in to the corresponding SFP combo port.

SD Card Slot

All of the x610 Series Switches have an SD card slot for storing configuration files and *AlliedWare Plus Operating System Software* image files on an SD card (or SDHC card). See Figure 10.

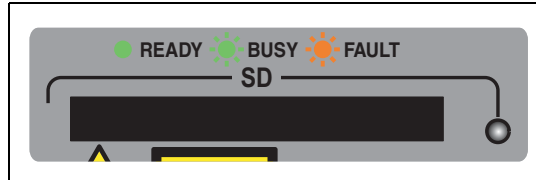


Figure 10. SD Card Slot

An SD card, shown in Figure 11, can make it easier for you to upgrade the files on a switch or transfer files between x610 switches.

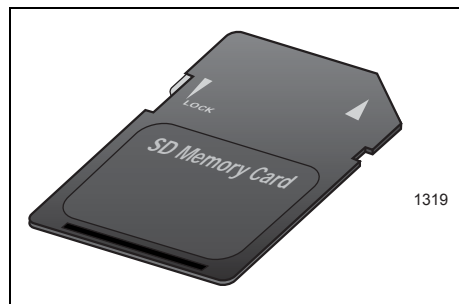


Figure 11. SD Card

Note

An SD card is not required for normal operations of the switch.

To insert an SD card, position it so that the manufacturer's brand label is facing up and press it into the slot until it is flush with the front of the chassis. To remove the SD card, gently press and release the card. The SD card will then pop out so you can grasp it with your fingers.

For information on how to transfer files to and from a SD card, refer to the *AlliedWare Plus Operating System Software Reference Guide*.

Port LEDs

The following sections describe the 10/100/1000Base-T port, SFP, and SFP+ LEDs.

10/100/1000 Base-T LEDs

On the non-PoE+ models, each port has two LEDs labeled L/A (link/activity) and D/C (duplex mode/collisions). Figure 12 shows the port LEDs on the non-PoE+ models.

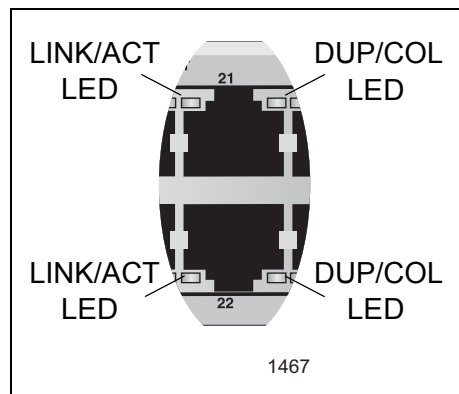


Figure 12. Port LEDs on non-PoE+ x610 Series Switches

On the PoE+ models, each port has two LEDs labeled L/A (link/activity) and PoE (Power over Ethernet). Figure 13 shows the port LEDs on the PoE+ models.

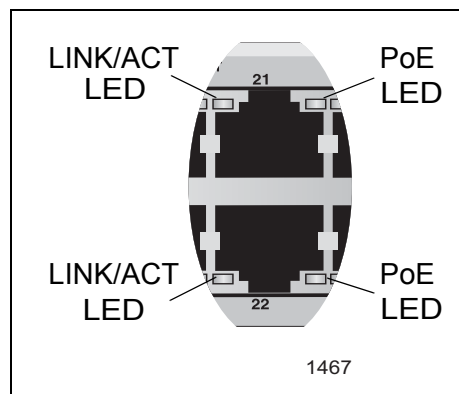


Figure 13. Port LEDs on PoE+ x610 Series Switches

Table 6 describes the LEDs for the Base-T ports.

Table 6. Switch Base-T LED Descriptions

LED	Function	State	Description
L/A	Link Status and Activity	Off	No link has been established between the port and the end node.
		Solid Green	The port has established a link at 1000 Mbps.
		Flashing Green	Packets are being received or transmitted at 1000 Mbps.
		Solid Amber	The port has established a link at 10 or 100 Mbps.
		Flashing Amber	Packets are being received or transmitted at 10 or 100 Mbps.
D/C	Duplex Mode and Collisions	Solid Green	The port is operating in full-duplex mode.
		Solid Amber	The port is operating in half-duplex mode (only applies when operating at 10 or 100 Mbps).
		Flashing Amber	Collisions are occurring on the port (only applies when operating at 10 or 100 Mbps, half-duplex mode).
PoE	Power over Ethernet Status	Off	There is no powered device detected.
		Solid Green	The end node is a powered device and the port is providing power to it.
		Solid Amber	The port is experiencing a problem providing PoE to the end node.
		Flashing Amber	The port is connected to a powered device but providing power to it would exceed the maximum PoE power budget of the switch.

SFP and SFP+ LEDs

For each SFP slot there is one LINK/ACTIVITY LED, as shown in Figure 14, Figure 15, Figure 16, and Figure 17.

For each SFP+ slot on the x610-24Ts/X, x610-24Ts/X-POE+, x610-48Ts/X, and x610-48Ts/X-POE+ switches there is one LINK/ACTIVITY LED, as shown in Figure 15 and Figure 17.

The SFP+ LED definitions are given in Table 7 and the SFP LED definitions are given in Table 8.

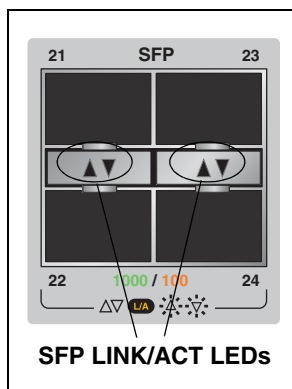


Figure 14. SFP LEDs on x610-24Ts and x610-24Ts-POE+ Switches

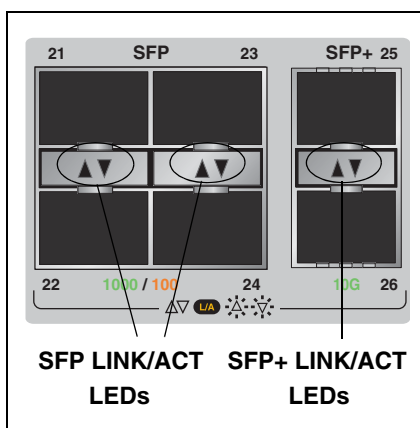


Figure 15. SFP and SFP+ LEDs on x610-24Ts/X and x610-24Ts/X-POE+ Switches

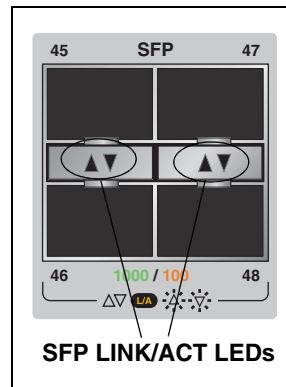


Figure 16. SFP LEDs on x610-48Ts and x610-48Ts-POE+ Switches

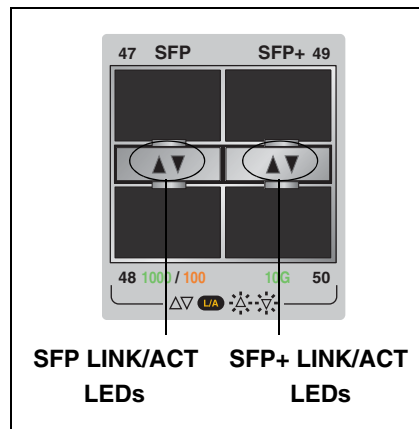


Figure 17. SFP and SFP+ LEDs on x610-48Ts/X and x610-48Ts/X-POE+ Switches

Table 7. SFP+ Slot LED Descriptions

LED	Function	State	Description
L/A	Link Status and Activity	Off	No link has been established between the port and the end node.
		Solid Green	The port has established a link at 10 Gbps.
		Flashing Green	Packets are being received or transmitted at 10 Gbps.

Table 8. SFP Slot LED Descriptions

LED	Function	State	Description
L/A	Link Status and Activity	Off	No link has been established between the port and the end node.
		Solid Green	The port has established a link at 1 Gbps.
		Flashing Green	Packets are being received or transmitted at either 100Mbps or 1 Gbps, depending on the transceiver installed.
		Solid Amber	The port has established a link at less than 1 Gbps.
		Flashing Amber	Packets are being received or transmitted at less than 1 Gbps.

System STATUS LEDs

The system STATUS LEDs on the front panel display general status information. To locate these LEDs, see Figure 18. On the rear panel there is a single system STATUS LED, as shown in Figure 19. See Table 9 for a description of the system STATUS LEDs.

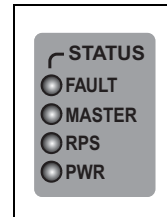


Figure 18. System STATUS LEDs on the Front Panel

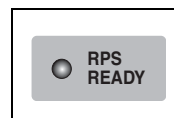


Figure 19. System STATUS LED on the Rear Panel

Table 9. System STATUS LED Descriptions

LED	State	Description
FAULT	Off	Indicates normal operation.
	Solid Red	Indicates a fault. The switch or the operating system software has malfunctioned. (Refer to Chapter 5, "Troubleshooting" on page 103 for instructions on how to troubleshoot a problem.)
MASTER	Off	Indicates that the switch is not the Stack Master.
	Flashing Green	Indicates the specific stack member's ID of the switch in response to the 'show stack indicator' command. The LED will repeatedly flash 'n' times in quick succession, followed by a longer pause, where n is the stack member's ID.
	Solid Green	Indicates that the switch is the Stack Master.

Table 9. System STATUS LED Descriptions (Continued)

LED	State	Description
RPS	Off	No optional redundant power supply is connected to the switch.
	Solid Green	An optional redundant power supply is physically connected to the switch and may be powered on or off.
PWR	Off	The switch is not receiving power.
	Solid Green	The switch is receiving power.
RPS READY (at rear)	Off	The RPS is not receiving power.
	Solid Green	The RPS is receiving power.

STACK LEDs

The STACK LEDs display the link status of the VCStack stacking module and its two stacking ports. If a stacking module or the stack cables are not installed, all LEDs remain off. To locate the STACK LEDs, see Figure 20, and for a description of the STACK LEDs, see Table 10.

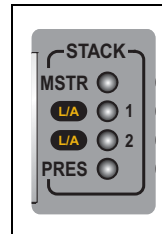


Figure 20. Switch STACK LEDs

Table 10. STACK LED Descriptions

LED	State	Description
MSTR	Off	The switch is not part of a stack or is a member unit of the stack.
	Solid Green	The switch is the master unit of the stack.
L/A 1	Off	Stack Port 1 has not established a link to a stacking port on another VCStack stacking module.
	Solid Green	Stack Port 1 has established a link to a stacking port on another VCStack stacking module.
	Flashing Green	Stack Port 1 has established a link to a stacking port on another VCStack stacking module and is sending or receiving packet traffic.

Table 10. STACK LED Descriptions (Continued)

LED	State	Description
L/A 2	Off	Stack Port 2 has not established a link to a stacking port on another VCSStack stacking module.
	Solid Green	Stack Port 2 has established a link to a stacking port on another VCSStack stacking module.
	Flashing Green	Stack Port 2 has established a link to a stacking port on another VCSStack stacking module and is sending or receiving packet traffic.
PRES	Off	The expansion slot for the VCSStack stacking module is empty.
	Solid Green	A VCSStack stacking module is installed in the switch.

Secure Digital (SD) LED

All x610 Series Switches have one Secure Digital (SD) LED, shown in Figure 21 and defined in Table 11.

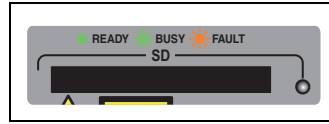


Figure 21. SD Slot LED

Table 11. SD LED Descriptions

LED	Function	State	Description
SD	Link Status and Activity	Flashing Amber	Indicates a fault has been detected. The SD card is not valid or a read or write procedure was unsuccessful.
		Solid Green	An SD card has been detected.
		Flashing Green	An SD card is reading or writing data. Do not eject the SD card when it is in this state.

Terminal Port

The terminal port is used to establish a local (out-of-band) management session with the switch. You establish a local management session by connecting a terminal or a personal computer with a terminal emulation program to the port.

The terminal port has an RJ-45 style connector. An RJ-45 to RS-232 management cable is supplied with the switch.

The terminal port is set to the following specifications:

- ☐ Default baud rate: 9600 bps (Range is 9600 to 115200 bps)
- ☐ Data bits: 8
- ☐ Parity: None
- ☐ Stop bits: 1
- ☐ Flow control: None

See Table 22 on page 118 for the pin signal definitions on the RJ-45 port.

Note

These settings are for a DEC VT100 or ANSI terminal, or an equivalent terminal emulation program.

Power Supplies

The x610-24Ts-POE+, x610-24Ts/X-POE+, x610-48Ts-POE+ and x610-48Ts/X-POE+ switches are supplied with a factory installed blank panel on the power supply port. Either a 250W (AT-PWR250) power supply (PSU), 800W (AT-PWR800) PSU, shown in Figure 22, or a 1200W (AT-PWR1200) PSU, shown in Figure 23, can be installed in these switches. Note that the AT-PWR250 supplies system power only to the switch. Either an AT-PWR800 or an AT-PWR1200 is required to supply power to the PoE+ ports in addition to system power to the switch.



Warning

Do not hot swap the power supply modules. Always disconnect the AC cord before the power supply module is removed and ensure the power supply module is correctly installed before reconnecting the AC cord.

Note

When installed, the AT-PWR1200 Module extends 5.6 cm (2.2 in.) from the back panel of the chassis.

The model of PSU that is installed determines the maximum number of PoE+ ports that are supported on the switch. The maximum number of PoE+ and PoE ports supported on the switch, depending on the model of PSU installed, is described in “Power Capacity” on page 55.

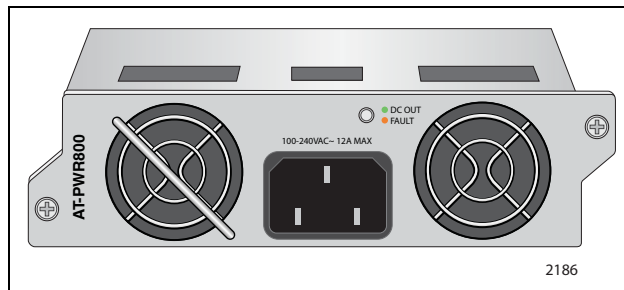


Figure 22. AT-PWR800 Power Supply

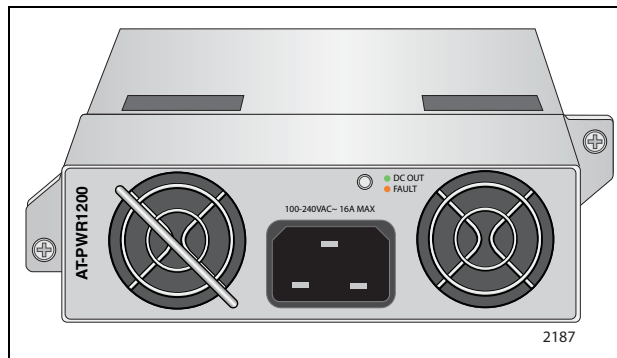


Figure 23. AT-PWR1200 Power Supply

Redundant Power Supplies

The Redundant Power Supply connector on an x610 Series switch rear panel can connect to an optional Redundant Power Supply (RPS), the AT-RPS3000. The RPS can provide power to the switch in the event of a failure of the switch's internal power supply.

The AT-RPS3000 has slots for two power supply modules. Either the AT-PWR800 (800W) or AT-PWR1200 (1200W) power supply modules can be installed in the RPS.



Warning

Do not hot swap the power supply modules. It is not necessary to power down the RPS before you remove or swap a power supply module. However, always disconnect the AC cord before the power supply module is removed and ensure the power supply module is correctly installed before reconnecting the AC cord.

When fully populated, the RPS can support up to four x610 switches simultaneously, depending on the switches configuration. The RPS can backup one high-power consumption switch or two low-power consumption switches with each power supply module. The 24 port switches are considered low-power consumption switches while the 48 port switches are considered high-power consumption switches. The RPS is not able to identify if the attached switch is a high-power consumption switch or a low-power consumption switch.

The RPS has four connectors on the rear panel, as shown in Figure 24. Connectors 1 and 2 supply power from power supply module A, the right side module, and connectors 3 and 4 supply power from power supply module B, the left side module.

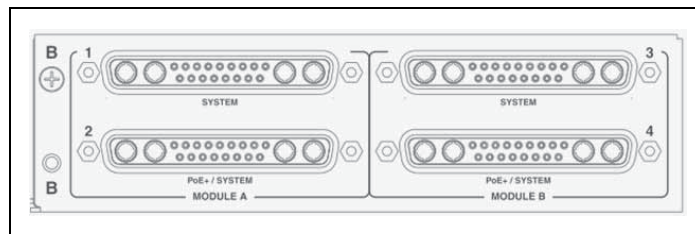


Figure 24. Connectors on RPS

Connectors 1 and 3 supply system power only and connectors 2 and 4 supply system power and extra PoE power. A switch connected to connector 2 will receive extra PoE power only from power supply module A and a switch connected to connector 4 will receive extra PoE power only from power supply module B.

The RPS can be the only source of PoE power for the switch or the RPS can boost the PoE power available from the primary power source, the power supply module installed in the switch. If the switch does not receive PoE power from its primary power supply, the available PoE power depends on the PoE rating of the associated power supply module in RPS. If the switch is able to get PoE power from both primary power supply and RPS, the primary power supply and the power supply module installed in the RPS will share the PoE load.

For information about installing the RPS, consult the documentation shipped with the unit.

The connector pinouts for the AT-RPS3000 redundant power supply are described in “AT-RPS3000 21-pin Connector Pinouts” on page 118.

AT-LBM (Loop Back) Module

The x610-48Ts/X and x610-48Ts/X-POE+ switches are shipped from the factory with an AT-LBM module installed in the expansion slot on the rear panel, as shown in Figure 25. This module is factory installed for the non-stacking configuration. It provides the capability for a full line rate, non-blocking switching configuration when there are connections on the x610-48Ts/X and x610-48Ts/X-POE+ switches to all 44 copper ports, two SFP ports, and two SFP+ ports. If you need to configure the switch for stacking, you may install a VCStack stacking module in place of the AT-LBM Module.

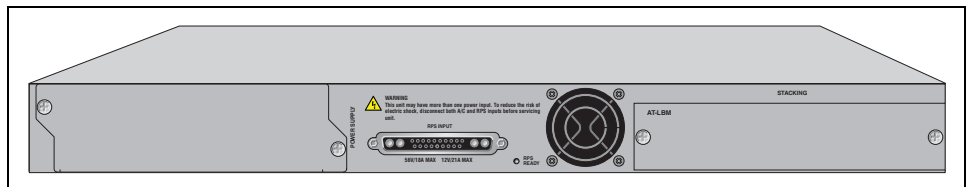


Figure 25. AT-LBM Module Installed in x610-48Ts/X Expansion Slot

Note

The AT-LBM module is very similar to a blank panel in its outward appearance except that it is marked with the “AT_LBM” model name in the upper left-hand corner of the faceplate.

If the AT-LBM module is replaced with either an AT-StackXG or AT-x6EM/XS2 stacking module, the switching configuration is no longer non-blocking.

VCStack Stacking Module

A Virtual Chassis Stack (VCStack) is two or more separate Allied Telesis switches that are configured to operate as a single logical switch. The component switches are connected via VCStack stacking modules installed in each switch.

Two VCStack stacking modules are available:

- ❑ The AT-StackXG has two full-duplex, 12 Gbps stacking ports, shown in Figure 26.
- ❑ The AT-x6EM/XS2 has two 10 Gbps SFP+ stacking slots, shown in Figure 27. Note that the port speed of the AT-x6EM/XS2 is fixed at 10 Gbps.

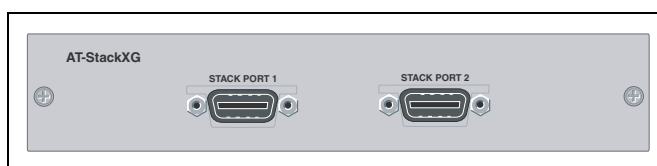


Figure 26. AT-StackXG Stacking Module

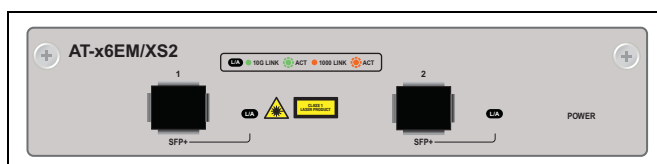


Figure 27. AT-x6EM/XS2 Stacking Module

Refer to “VCStack Stacking Module Installation” on page 79 for the AT-StackXG and AT-x6EM/XS2 stacking module installation instructions.

For more information on stacking see Chapter 2, “Virtual Chassis Stacking” on page 57 and refer to the Allied Telesis Inc. website (www.alliedtelesis.com) for the *Overview of Virtual Chassis Stacking (VCS)* and the *Virtual Chassis Stacking* section of the *AlliedWare Plus Operating System Software Reference Guide*.

AC Power Connector

The x610 switches have a single AC power supply socket on the rear panel, which has autoswitch AC inputs. To power the switch on or off, connect or disconnect the power cord.

For countries that require 100-125 VAC installations, the power cord plug provided with the AT-PWR1200 power supply has a 20 Amp, 125 V NEMA 5-20P plug. This plug is only compatible with a NEMA 5-20R receptacle. See Figure 28.

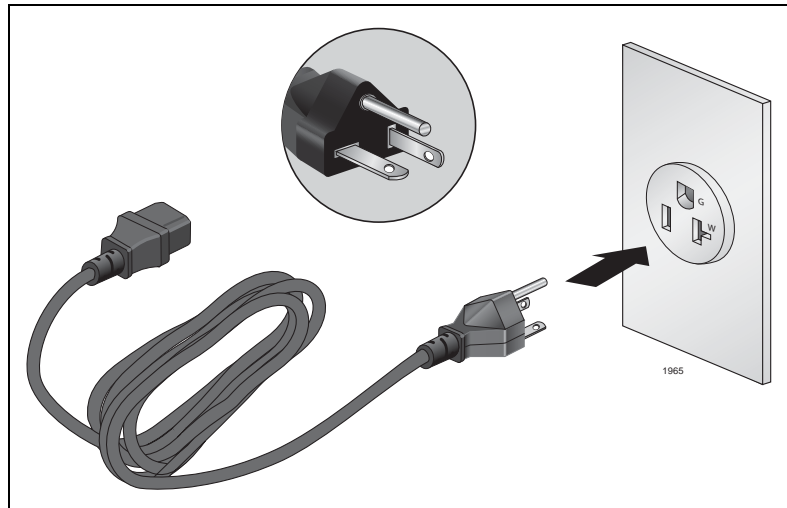


Figure 28. 100-125 VAC 125 V NEMA 5-20 Plug and Receptacle

Refer to “Technical Specifications” on page 113 for the input voltage range.

Power Over Ethernet Plus (PoE+)

The following section applies to x610-24Ts-POE+, x610-24Ts/X-POE+, x610-48Ts-POE+ and x610-48Ts/X-POE+ Gigabit Ethernet switches only.

The 10/100/1000Base-T ports on these switches feature Power over Ethernet (PoE), defined in the IEEE 802.3af standard, and Power over Ethernet Plus (PoE+), defined in the IEEE 802.3at standard.

PoE+ is a mechanism for supplying power to network devices over the same twisted pair cables used to carry network traffic. Power is injected on the Ethernet cabling along with data by Power Sourcing Equipment (PSE), like an Ethernet LAN switch or router. A device that receives its power over an Ethernet cable is called a Powered Device (PD).

The switch automatically determines whether or not a device connected to a port is a PD. A PD has a signature resistor or capacitor that the switch can detect over the Ethernet cabling. If the resistor or capacitor is present, the switch assumes that the device is a PD.

Once a PD is discovered, a PSE may optionally perform PD classification by applying a DC voltage to the port. If the PD supports optional power classification it will apply a load to the line to indicate to the PSE the classification the device requires.

For more detailed information about PoE+ see the latest release of the *AlliedWare Plus Operating System Software Reference Guide*.

Power Classes

Since PDs may require differing power ranges, the IEEE 802.3at Power Ethernet standards classifies PDs according to their power consumption. By providing the PSE with its power range, the PD allows the PSE to supply power with greater efficiency. The power classes as outlined by IEEE 802.3at are as follows, showing the different PD classes and the PSE power output for each corresponding PD power range:

Table 12. Class vs. Power Levels

PD Class	Maximum Power Level Output at the PD*	Maximum Power Level Output at the PSE
0	0.44W to 12.95W	15.4W
1	0.44W to 3.84W	4.0W
2	3.84W to 6.49W	7.0W
3	6.49W to 12.95W	15.4W
4	12.95W to 25.5W	30W

* The Maximum Power Level Output levels reflect the loss introduced by a 100 meter Ethernet cable between the Power Source Equipment (PSE) and the Power Device (PD).

A port connected to a network node that is not a PD functions as a regular Ethernet port, without PoE+. The PoE+ feature remains enabled on the port but no power is delivered to the device.

Note

On the 24 port x610 PoE+ switches, the PoE+ power supplied from from ports 21R, 22R, 23R and 24R is unaffected by insertion of a SFP module into the corresponding SFP combo port.

On the 48 port x610 PoE+ switches, the PoE+ power supplied from from ports 47R and 48R is unaffected by insertion of a SFP module into the corresponding SFP combo port.

Power Capacity

Either a 250W (AT-PWR250), 800W (AT-PWR800) or a 1200W (AT-PWR1200) power supply (PSU) can be installed in the x610-24Ts-POE+, x610-24Ts/X-POE+, x610-48Ts-POE+ and x610-48Ts/X-POE+ switches. The model of PSU that is installed determines the maximum number of PoE+ ports that are supported on the switch. The following three tables show the maximum number of PoE+ and PoE ports supported on the switch, depending on the model of PSU installed. Note that the numbers in these tables only provide the maximum number of PoE+ and PoE ports supported and that there are many combinations of PoE+ and PoE ports that are supported.

Table 13. PoE+ Ports Supported With AT-PWR250 Power Supply Unit

Model	Available PoE Power	IEEE 802.3at Class 4 (30W)	IEEE 802.3af Class 3 (15.4W)
x610-24Ts-POE+	None	None	None
x610-24Ts/X-POE+	None	None	None
x610-48Ts-POE+	None	None	None
x610-48Ts/X-POE+	None	None	None

Table 14. PoE+ Ports Supported With AT-PWR800 Power Supply Unit

Model	Available PoE Power	IEEE 802.3at Class 4 (30W)	IEEE 802.3af Class 3 (15.4W)
x610-24Ts-POE+	480W	Max 16 ports	Max 24 ports
x610-24Ts/X-POE+	480W	Max 16 ports	Max 24 ports
x610-48Ts-POE+	480W	Max 16 ports	Max 31 ports
x610-48Ts/X-POE+	480W	Max 16 ports	Max 31 ports

Table 15. PoE+ Ports Supported With AT-PWR1200 Power Supply Unit

Model	Available PoE Power	IEEE 802.3at Class 4 (30W)	IEEE 802.3af Class 3 (15.4W)
x610-24Ts-POE+	780W	Max 24 ports	Max 24 ports
x610-24Ts/X-POE+	780W	Max 24 ports	Max 24 ports
x610-48Ts-POE+	780W	Max 26 ports	Max 48 port
x610-48Ts/X-POE+	780W	Max 26 ports	Max 48 port

Chapter 2

Virtual Chassis Stacking

This chapter contains the following sections:

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- ❑ “Features of VCStacking” on page 58
- ❑ “The Physical Stack” on page 59
- ❑ “Resiliency Link” on page 60
- ❑ “Resiliency Link Configurations via Switch Ports” on page 61
- ❑ “Stack Formation” on page 62
- ❑ “The Role of the Stack Master” on page 62
- ❑ “Connecting switches into a stack” on page 65
- ❑ “Steps to set up a VCStack” on page 67
- ❑ “Steps to replace a stack member” on page 69
- ❑ “Provisioning” on page 69

VCStack Introduction

Virtual Chassis Stacking (VCStack™) is the name given to two or more separate Allied Telesis switches that are configured to operate as a single logical switch. The VCStack operates as a single device and is not perceived by end users, or the traffic itself, to be any more than a single network node. From a configuration and management point of view, it is as though the switches are one device with a seamless transition from the ports of one stack member to the ports of the next.

Each component switch in a VCStack is called a stack member. The VCStack also contains one stack master, which is the switch that manages the stack. To function as a VCStack the component switches are connected using high-speed stacking links.

When configuring a VCStack, there are no limitations on how the ports on one stack member can interact with the ports of another stack member. VLANs, port aggregations, port mirroring, and port ranges in the configuration can all span multiple stack members. The stack member ports truly operate as though they all belong to one virtual switch. The same applies with Layer 2 and Layer 3 switching (both unicast and multicast).

A VCStack may also include a resiliency link, which is an extra, out-of-band, data link between stack members. In the event of loss of communication across the stacking connection, the stack members can determine the status of other members via communication on the resiliency link. This assists the stack members in deciding the correct course of action when communication on the stack is lost.

For more information about Virtual Chassis Stacking (VCStack™) see the *Stacking Introduction* and *Stacking Commands* chapters in the *AlliedWare Plus Operating System Software Reference* from www.alliedtelesis.com.

Features of VCStacking

Creating a VCStack greatly eases network management, because you can configure all the stacked devices via a single IP address. Creating a VCStack will often eliminate your need to configure protocols such as VRRP and Spanning Tree. VCStack also enables you to create highly resilient networks. This resiliency can be applied in several ways.

Within the stack itself, switch interconnection is via two links. The second link is able to provide an alternative data path, so the stack continues to function if a single link fails. User ports can also be made extremely resilient by utilizing link aggregation. Aggregated links can span ports, modules, and even switches within the stack. Creating aggregated links that span multiple switches within a stack creates a resilient configuration. Communication will still exist even if a switch and its aggregated ports fail.

The Physical Stack

Depending on the switch types used, a stack can comprise from 2 to 8 individual stack members interconnected via high speed stacking links. A stack always has a primary stack member called the stack master, and can contain up to 7 other stack members. For information about VCSStack stacking modules available and cable specifications, see “Connecting switches into a stack” on page 65 for more information.

Two Switch Stack Configuration

This configuration, shown in Figure 29, uses two switches that are connected back to back via two high-speed stacking links. In this configuration the stack can still function using only a single high speed link. Note that stacking ports labeled 1 must connect to stacking ports labeled 2. Also, in this example the switches have AT-StackXG stacking modules installed.

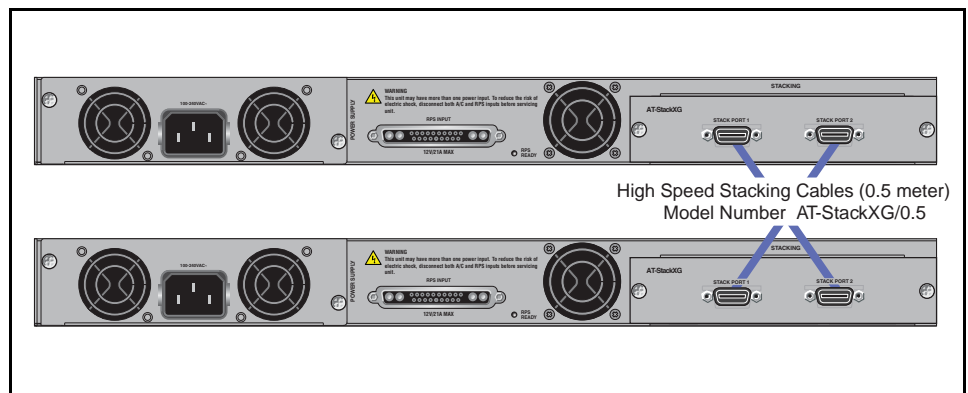


Figure 29. Back-to-Back Topology (x610 Switches)

Ring Configuration

A virtual stack using x610 switches can comprise up to 8 stack members connected in a ring topology. Figure 30 shows a ring comprising 3 stacked x610 series switches with AT-StackXG stacking modules installed. Because an alternate path is provided between the stack members, this topology offers a very resilient configuration.

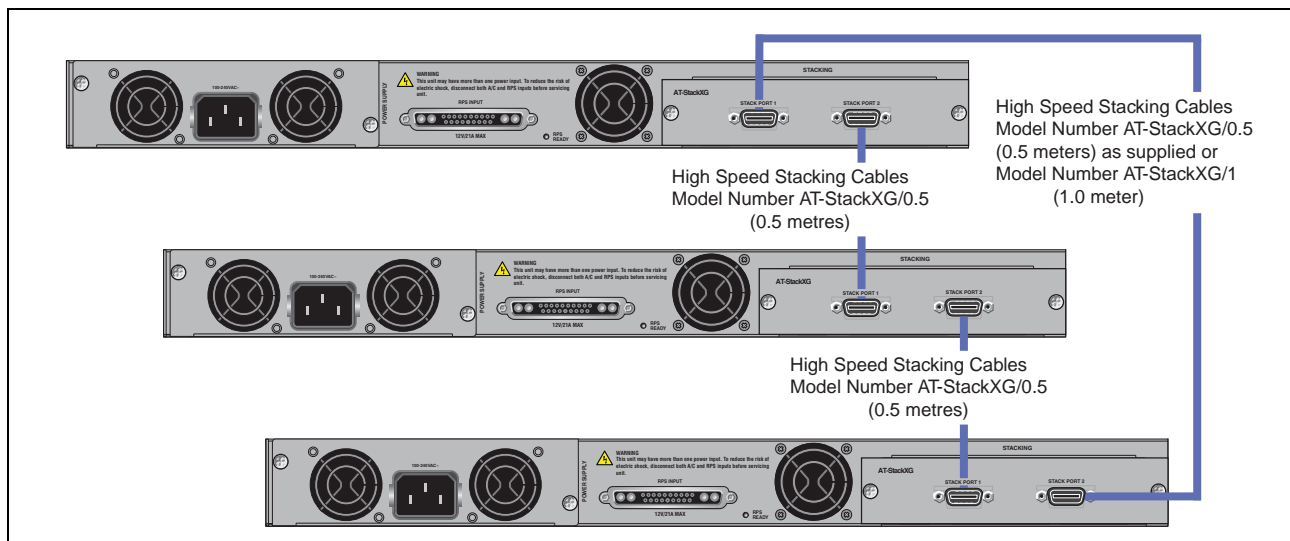


Figure 30. VCStack Ring Topology Using x610 Switches

Resiliency Link

The purpose of the resiliency link is to provide the stack members with status information that enables them to detect whether the stack master is still operational after it has suffered either a power-down or software lock-up. This enables the other stack members to always re-elect a new stack master safely, and to avoid a situation where there are two isolated masters both running the same configuration

A resiliency link operates using a designated VLAN running over switch port connections between each stack member.

For more information about the stack resiliency link refer to the *Stacking Introduction* and *Stacking Commands* chapters in the *AlliedWare Plus Operating System Software Reference* from www.alliedtelesis.com.

Resiliency Link Configurations via Switch Ports

Two resiliency-link configurations that connect to switch ports are shown below. Figure 31 shows the resiliency link connecting in a ring topology, whilst Figure 32 shows the resiliency link connecting to its switch ports via a network hub. In both configurations, the resiliency link connections are made using the ResiliencyLink VLAN and attaching the switch ports to the VLAN.

For more information about the stack resiliency link refer to the *Stacking Introduction* and *Stacking Commands* chapters in the *AlliedWare Plus Operating System Software Reference* from www.alliedtelesis.com.

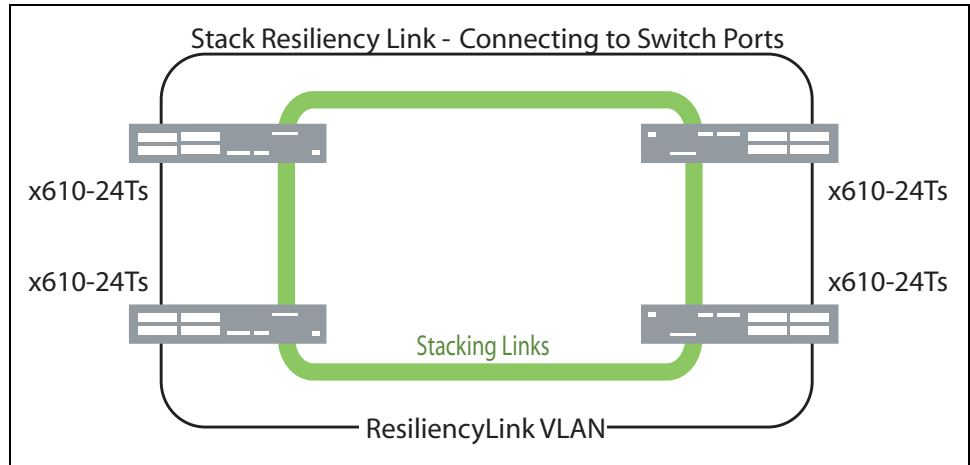


Figure 31. Resiliency link Connecting to Switch Ports Over the ResiliencyLink VLAN

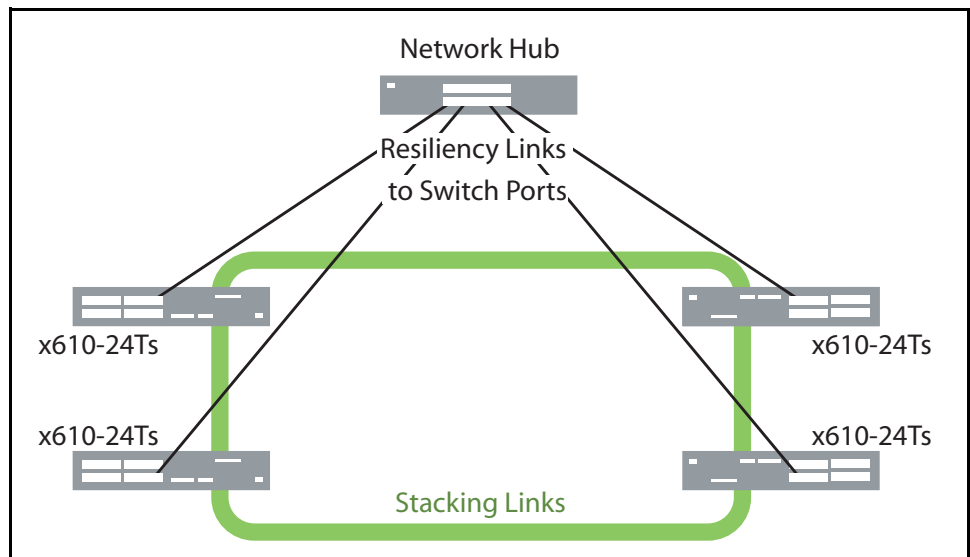


Figure 32. Resiliency link Connecting to sWitch Ports Over the ResiliencyLink VLAN Using a Network Hub

Stack Formation

A VCSStack always contains a master plus a number of stack members. To be part of a stack, a switch must connect to other potential stack members via dedicated stacking ports on the VCSStack stacking module located in the rear of the switch.

Once the switches have been physically connected to form a stack, powering all the members on automatically sets off a number of processes that enable the stack members to detect the presence of the other stack members and form themselves into a VCSStack.

The Role of the Stack Master

In addition to being a member of its VCSStack, the stack master manages functions such as software version control and distribution, routing processing, and network management.

Selecting the Stack Master

The stack members are able to automatically select which switch will become the stack master. This selection is based on two components:

1. The stack member's priority setting.
2. The stack member's MAC address.

The master is the switch with the lowest 'priority setting', or if no 'priority settings' are configured, the switch with the lowest MAC address will become the stack master. When a stack member is initially booted, its priority value defaults to 128. Therefore if all switches retain their defaults, then the stack master will be determined by MAC address comparison. The stack also assigns a Stack Member-ID number to each member. This number provides a unique reference number for switches within the stack; it plays no part in selecting the stack master. The Stack Member-ID is the entity used as the first digit of the three component port identifier numbers. For example, port number 2.0.14 has the Stack Member-ID of 2.

Note

Modify your configuration scripts to match any changes you have made to the Stack Member-ID assignments.

Note

New switches are shipped with a Stack Member-ID of 1 and a priority of 128. If four such switches are created as a stack, the switch with the lowest MAC address will be selected to be the stack master (because all priority settings are 128). The remaining three stack member devices will then reboot and automatically be assigned ID values of between 2 and 4. The stack master does not reboot and retains its Stack Member-ID of 1.

For more information about the stack master refer to the *Stacking Introduction* and *Stacking Commands* chapters in the *AlliedWare Plus Operating System Software Reference* from **www.alliedtelesis.com**.

Common Stack Configuration

Once the switches have configured themselves into a VCSStack, they all share the same configuration information and startup scripts.

Stack Management VLAN

Managing the stack is the same as managing an individual switch. You can connect to the asynchronous console port of any stack member, or you can set an IP address on a network VLAN (for example, VLAN 1) and use SSH or Telnet for remote access.

As the switches form themselves into a stack, each switch creates a common stack management VLAN and a management IP address. Both the VLAN ID and the IP address are internal entities that are used between the stacked switches, via the VCSStack stacking module interfaces, and therefore do not appear on the user network.

Initially the stack assigns the default VLAN tag ID of 4094 to the management VLAN, and assigns an IP address from the subnet 192.168.255.0 / 28 to this VLAN as the management IP address. Once the stack has formed, you can change both these settings.

For more information about stack management refer to the *Stacking Introduction* and *Stacking Commands* chapters in the *AlliedWare Plus Operating System Software Reference* from **www.alliedtelesis.com**.

Stack Member Identification

When a switch becomes a member of a VCSwitch it is assigned a Stack Member-ID. Stack status information is displayed on the STACK and STATUS LEDs on the switch's front panel, shown in Figure 33.

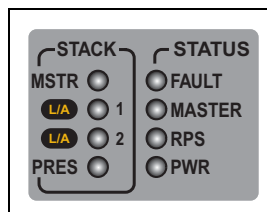


Figure 33. STACK and STATUS LEDs

The LEDs that indicate the switch's status within the stack are shown in Table 16.

Table 16. STACK LED Descriptions

LED	State	Description
MSTR	Off	The switch is not part of a stack or is a member unit of the stack.
	Solid Green	The switch is the master unit of the stack.
L/A 1	Off	Stack Port 1 has not established a link to a stacking port on another VCSwitch stacking module.
	Solid Green	Stack Port 1 has established a link to a stacking port on another VCSwitch stacking module.
	Flashing Green	Stack Port 1 has established a link to a stacking port on another VCSwitch stacking module and is sending or receiving packet traffic.

Table 16. STACK LED Descriptions (Continued)

LED	State	Description
L/A 2	Off	Stack Port 2 has not established a link to a stacking port on another VSTACK stacking module.
	Solid Green	Stack Port 2 has established a link to a stacking port on another VSTACK stacking module.
	Flashing Green	Stack Port 2 has established a link to a stacking port on another VSTACK stacking module and is sending or receiving packet traffic.
PRES	Off	The expansion slot for the VSTACK stacking module is empty.
	Solid Green	A VSTACK stacking module is installed in the switch.
MASTER	Off	Indicates that the switch is not the Stack Master.
	Flashing Green	Indicates the specific stack member's ID of the switch in response to the 'show stack indicator' command. The LED will repeatedly flash 'n' times in quick succession, followed by a longer pause, where n is the stack member's ID.
	Solid Green	Indicates that the switch is the STACK Master.

Connecting switches into a stack

The proprietary high-speed communication protocol that is used over the stacking links requires multiple twisted pairs and a high level of shielding. This means that to stack x610 switches, specialized cables and connections are required.

VSTACK Stacking Modules, Cables, and Connections

The stacks are connected via the stacking ports on the VSTACK stacking modules, which are installed in the back of each switch. There are two VSTACK stacking modules available:

- The AT-StackXG, which has two full-duplex, 12 Gbps stacking ports
- The AT-x6EM/XS2, which has two 10 Gbps SFP+ stacking slots

The following cables are used to connect the stacking ports when using

the AT-StackXG stacking module:

- ❑ High Speed Stacking Cables (0.5 meter) - StackXG/0.5
- ❑ High Speed Stacking Cables (1.0 meter) - StackXG/1

The specifications for SFP+ transceivers able to be installed in the AT-x6EM/XS2 stacking module can be found on our Allied Telesis web site at **www.alliedtelesis.com**.

VCStack restrictions

There are some restrictions to what products and connections you can combine in a single stack. In general, different switch families cannot be stacked together and you cannot combine different stacking methods or cables.

x610 Series switches can stack with other x610 switches and with x600 switches, as described in "Mixed-mode VCStack (stacking x610 switches with x600 switches)" below.

The maximum stack size is:

- ❑ 8, when stacking x610 Series switches
- ❑ 4, when stacking 600 Series with x610 Series switches
- ❑ 4, when stacking x600 Series switches

Mixed-mode VCStack (stacking x610 switches with x600 switches)

The x600 and x610 switches support a feature called mixed-mode stacking. This feature allows x600 and x610 units to be stacked together to form a single stack. Note that if a x610 switch is to be part of mixed-mode VCStack then an AT-StackXG must be installed in the switch.

In a mixed-mode VCStack, for stack compatibility the x610 Series switches operate as x600 Series switches, not as x610 Series switches. If you stack x610 Series switches with x600 Series switches, note the following restrictions:

- ❑ Synchronization disabled. When mixed-mode stacking is enabled the VCStack software auto synchronization feature is disabled because the x600 and x610 run different software releases. When mixed-mode stacking is disabled then the software synchronization feature is re-enabled. For more information about VCStack software auto synchronization refer to the *Stacking Introduction* and *Stacking Commands* chapters in the *AlliedWare Plus Operating System Software Reference* from **www.alliedtelesis.com**.
- ❑ Software upgrades. Because software releases are not synchronized in a mixed-mode stack, the preferred release file must be manually copied to each stack member and set individually. The simplest way to do this is to 'remote-login' to each stack member and then enter the 'boot system' command.

Steps to set up a VCStack

There are no set rules regarding the order in which stack configuration tasks need to be carried out. However, these steps provide a guideline to help ensure that the stack creation process goes smoothly.

1. Prepare the switches

Before connecting any of the switches together ensure that all switches have the same feature licences installed. If you have purchased feature licences to enable certain features to operate on the stack, then all stack members need to have the licences installed. If some stack members have feature licences installed for features that will not be used on the stack, and other switches do not have those licences installed, remove those unnecessary licences.

2. Install and power the stack master

Install and power up the master switch. It will detect that there are no other members in the stack, so it will elect itself master.

3. Install and power the backup member

Install the next switch, connecting the stacking cable from that switch to the master.

Note

Make sure the stacking cables are crossed over between the stack members. This means that stack port 1 on switch 1 should connect to stack port 2 on switch 2. If this is not done, the stack links will not come up and the stack will not form.

Power up the switch. It will detect that there is already an active master, and so will come up as a backup member. The active master will assign it the first available stack ID.

The active master will check that the new stack member has the same software version as itself. If the software versions are different, the active master will use the software auto-synchronization mechanism to force the new stack member to run the same software version.

4. Install and power the next backup member

Repeat step 3 for each of the other switches in the stack, remembering to connect port 2 of each new switch to port 1 of its neighbor. For last switch added to the stack, connect port 1 of this switch to port 2 of the first installed switch.

5. Confirm that the stack is operating

Check that the stack links have all come up successfully. This can be done by checking the LEDs on the switches. The port LEDs for all stack

members should be green. Port LEDs that are off or flashing amber indicate that the stack is not operating correctly. The master or status LED will be green on the switch that is the stack master.

6. Configure the stack as one switch

You are now ready to configure the stack with channel groups, VLANs, IP addresses, and so on.

Once you are happy with the stack configuration, make a backup copy of the configuration file.

Steps to replace a stack member

If you need to replace a stack member, use the following steps to achieve a smooth transition.

1. Configure the Stack ID on the replacement switch

Prepare the replacement switch by configuring it with the same stack ID as the switch that you are replacing.

2. Configure the feature licenses

Ensure that the replacement switch is configured with the same set of feature licenses as the existing stack members.

3. Remove the failed switch

Unplug the failed switch from the stack.

4. Install the replacement switch

Connect the stacking cables to the replacement switch and power up the switch. It will detect that there is already an active master, and so will come up as a stack member.

The active master will check that the new stack member has the same software version as itself. If the software versions are different, the active master will use the software auto-synchronization mechanism to force the new stack member to run the same software version.

Note that if the software releases differ between the stack members significantly, then the stack master may not be able to upgrade the new switch automatically. If this happens, you should see a log message indicating incompatible stack software versions, in which case you will have to manually upgrade the new switch to the correct release.

The new switch will also receive the startup configuration from the active master. As the replacement switch has been configured with the same stack ID as the replaced switch, it will receive exactly the same configuration as the replaced switch, and will operate exactly as that switch had.

Provisioning

Provisioning provides the ability to pre-configure ports that are not yet present in a switch or in a stack.

Similarly, if you know that a switch is going to be added to a stack, you can pre-configure the new switch in anticipation of its addition to the stack.

With provisioning, you can configure stack members and their ports even though they are not currently physically present, and configure them ready for future addition. This means that you can either pre-configure ports belonging to a bay or switch that has not yet been installed, or load a configuration that references these ports.

It is possible to provision both x610 Series switches and x600 Series

switches in a stack. This is possible even if mixed-mode stacking is disabled on x610 Series switches.

For more information about stacking provisioning refer to the *Stacking Introduction* and *Stacking Commands* chapters in the *AlliedWare Plus Operating System Software Reference* from **www.alliedtelesis.com**.

Chapter 3

Installing the Hardware


This chapter provides procedures to install a x610 switch. The chapter contains the following sections:

- ❑ “Reviewing Safety Precautions” on page 72
- ❑ “Unpacking a Switch” on page 75
- ❑ “Installing the Power Cord Retaining Clip” on page 76
- ❑ “Installing the Switches in an Equipment Rack” on page 77
- ❑ “VCStack Stacking Module Installation” on page 79

Reviewing Safety Precautions

Please review the following safety precautions before you begin to install the switches or any of their components.

Note

The  indicates that a translation of the safety statement is available in a PDF document “Translated Safety Statements” posted on the Allied Telesis website at www.alliedtelesis.com.




Warning: Class 1 Laser product.  L1




Warning: Do not stare into the laser beam.  L2




Warning: To prevent electric shock, do not remove the cover. No user-serviceable parts inside. This unit contains hazardous voltages and should only be opened by a trained and qualified technician. To avoid the possibility of electric shock, disconnect electric power to the product before connecting or disconnecting the LAN cables.  E1





Warning: Do not work on equipment or cables during periods of lightning activity.  E2




Warning: Power cord is used as a disconnection device. To de-energize equipment, disconnect the power cord.  E3





Warning: Class I Equipment. This equipment must be earthed. The power plug must be connected to a properly wired earth ground socket outlet. An improperly wired socket outlet could place hazardous voltages on accessible metal parts.  E4


Pluggable Equipment. The socket outlet shall be installed near the equipment and shall be easily accessible.  E5




Caution: Air vents must not be blocked and must have free access to the room ambient air for cooling.  E6

Warning: Operating Temperature. This product is designed for a maximum ambient temperature of 40° degrees C.  E7


All Countries: Install product in accordance with local and National Electrical Codes.  E8

Circuit Overloading: Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.  E21


Caution: Risk of explosion if battery is replaced by an incorrect type. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.


Attention: Le remplacement de la batterie par une batterie de type incorrect peut provoquer un danger d'explosion. La remplacer uniquement par une batterie du même type ou de type équivalent recommandée par le constructeur. Les batteries doivent être éliminées conformément aux instructions du constructeur.  E22




Warning: Mounting of the equipment in the rack should be such that a hazardous condition is not created due to uneven mechanical loading.  E25




Warning: This unit might have more than one power cord. To reduce the risk of electric shock, disconnect all power cords before servicing the unit.  E30

If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than the room ambient temperature. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (T_{mra}).  E35

Caution: Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.  E36



Warning: Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuits (e.g., use of power strips).  E37



Warning: To reduce the risk of electric shock, the PoE ports on this product must not connect to cabling that is routed outside the building where this device is located. *↪* E40



Caution: The unit does not contain field serviceable components. Please return damaged units for servicing. *↪* E42



Caution: The Ethernet PoE ports are only intended for installation in Environment A as defined in IEEE 802.3af. All interconnected equipment must be contained in the same building including the interconnected equipment's associated LAN connections.

Unpacking a Switch

To unpack a switch, perform the following procedure:

1. Remove all components from the shipping packages.

Note

Store the packaging material in a safe location. You must use the original shipping material if you need to return the unit to Allied Telesis.

2. Place the switch on a level, secure surface.
3. For a non-PoE switch, make sure the following components are included in your switch package. If any item is missing or damaged, contact your Allied Telesis sales representative for assistance.
 - ☐ One non-PoE x610 Series Layer 3 Gigabit Ethernet Switch
 - ☐ Two rack-mount brackets
 - ☐ Twelve flathead Phillips rack-mount bracket screws
 - ☐ Four regional AC power cords (Americas, Australia, EU, Japan, and UK only)
 - ☐ One AC power cord retaining clip
 - ☐ One management cable for local management
4. For a PoE switch, make sure the following components are included in your switch package. If any item is missing or damaged, contact your Allied Telesis sales representative for assistance.
 - ☐ One PoE x610 Series Layer 3 Gigabit Ethernet Switch
 - ☐ Two rack-mount brackets
 - ☐ Twelve flathead Phillips rack-mount bracket screws
 - ☐ One management cable for local management

Installing the Power Cord Retaining Clip

This section applies to the fixed power supplies installed in the x610-24Ts, x610-24Ts/X, x610-48Ts, and x610-48Ts/X switches and to the AT-PWR250 and AT-PWR800 power supplies.

Perform the following procedure to install the power cord retaining clip on the switches:

1. Locate the power cord retaining clip, shown in Figure 34.

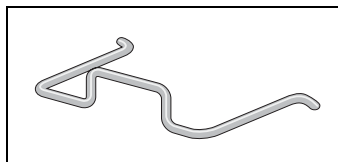


Figure 34. Power Cord Retaining Clip

2. Install the clip on the AC power connector on the rear panel of the switch. With the 'u' of the clip facing down, press the sides of the clip toward the center and insert the short ends into the holes in the retaining bracket, as shown in Figure 35.

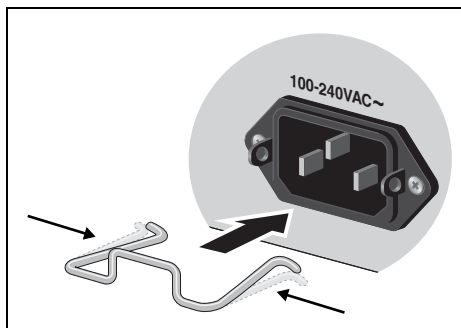


Figure 35. Inserting the Retaining Clip into the Retaining Bracket

You are now ready to install the switches in the equipment rack, as explained in the next procedure.

Installing the Switches in an Equipment Rack

Perform the following procedure to install each switch in a standard 19-inch rack:

Note

Steps 1, 2, and 3 are optional. These steps provide instructions on how to remove the snap-on plastic feet from the bottom of a switch. You can leave the feet on.

1. Place the switch upside down on a level, secure surface.
2. Using a flat-head screwdriver, remove the snap-on plastic feet from the bottom of the switch, as shown in Figure 36.

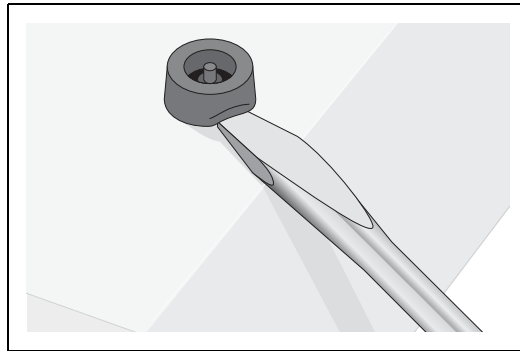


Figure 36. Removing the Feet

3. Turn the switch over.
4. Attach a rack-mount bracket to one side of the switch using six of the screws that come with the switch and then install the second rack-mount bracket on the other side of the switch with the six remaining screws, as shown in Figure 37.

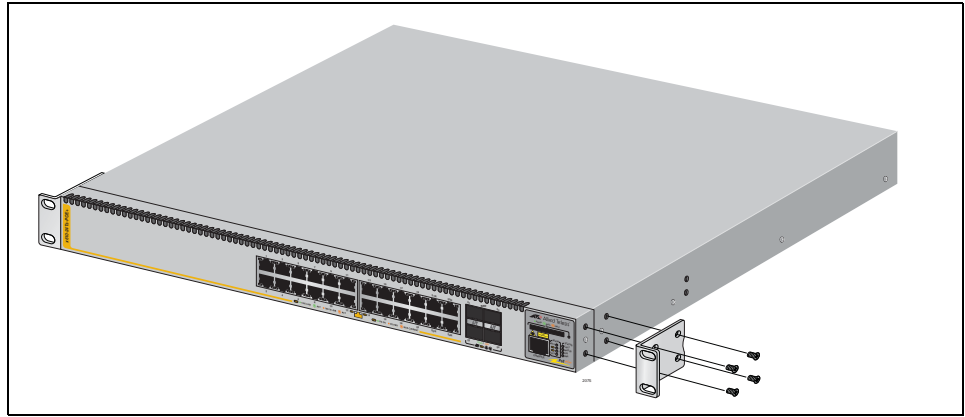


Figure 37. Attaching Rack-Mount Brackets

5. Mount the switch in a 19-inch rack using standard screws (not provided), as shown in Figure 38.

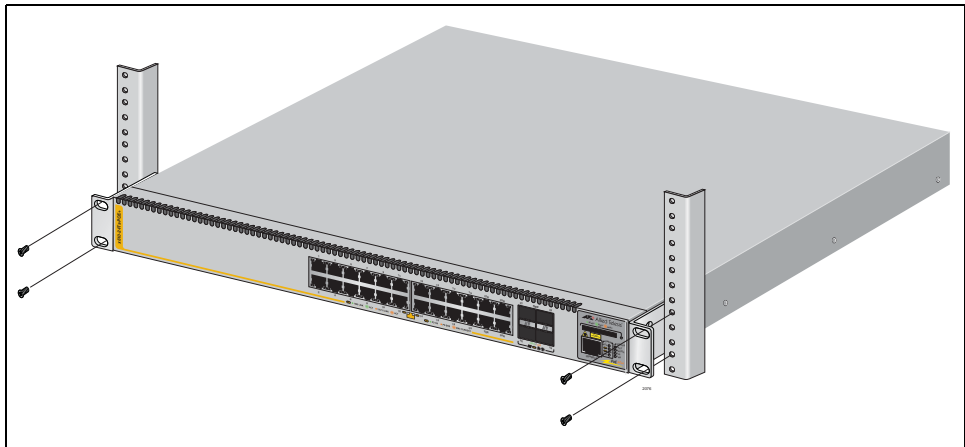


Figure 38. Mounting the Switch in a Rack

VCStack Stacking Module Installation

- Overview** When you are preparing the x610 switches for a VCStack configuration, a VCStack stacking module must be installed in the expansion slot on the rear panel of the unit. Two VCStack stacking modules are available:
- ❑ The AT-StackXG, shown in Figure 39, has two full-duplex, 12 Gbps stacking ports.
 - ❑ The AT-x6EM/XS2, shown in Figure 40, has two 10 Gbps SFP+ stacking slots.

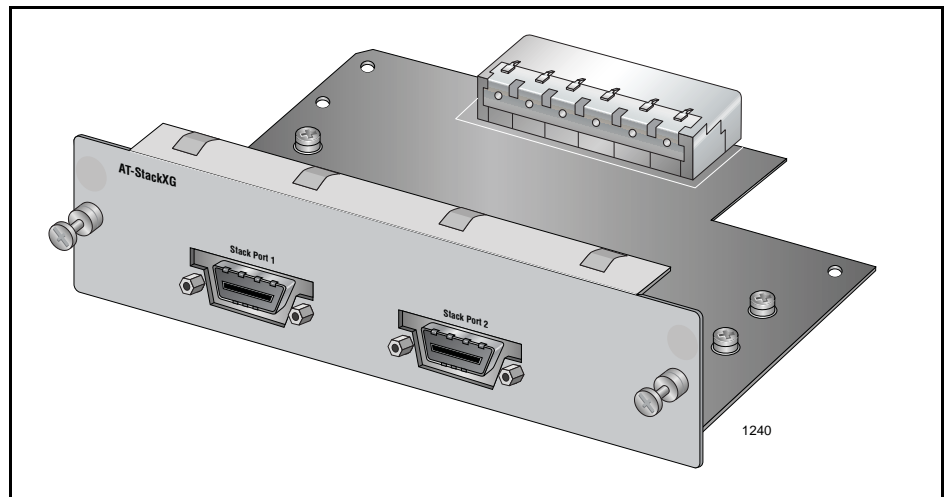


Figure 39. AT-StackXG Stacking Module

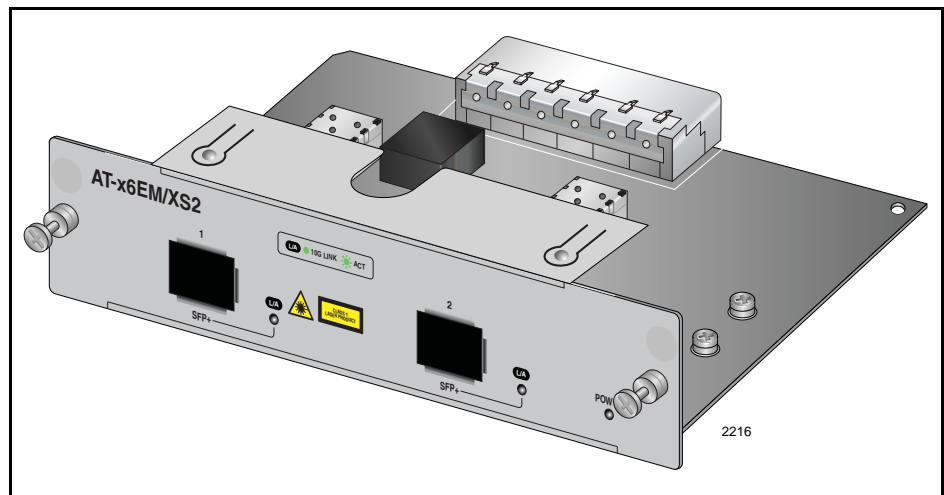


Figure 40. AT-x6EM/XS2 Stacking Module

Note that if the x610 switch is to be part of mixed-mode VCStack an

AT-StackXG must be installed.

Preparation

Review the following information before installing a VCStack stacking module:

- ❑ The AT-StackXG and AT-x6EM/XS2 stacking modules are hardware hot-swappable. You can install or replace a module while the switch is powered on.



Caution

If the stacking module is added or replaced in an operating stack, the stack topology may change and cause the stack to reboot and interrupt network traffic.

- ❑ The AT-StackXG and AT-x6EM/XS2 stacking modules are supported in all x610 series products.

Note

Do not install an AT-StackXG or AT-x6EM/XS2 stacking module until you have read the latest version of the *AlliedWare Plus Release Notes* and the x610 Series product documentation.

Installing a VCStack Stacking Module

To install an AT-StackXG or AT-x6EM/XS2 stacking module, perform the following procedure:

1. Remove the module from the shipping package.

Note

Store the packaging material in a safe location. You must use the original shipping material if you need to return the unit to Allied Telesis.

2. Remove the blank panel or AT-LBM module from the expansion slot on the rear panel of the switch by loosening the two captive screws on the panel with a cross-head screwdriver, as shown in Figure 41.

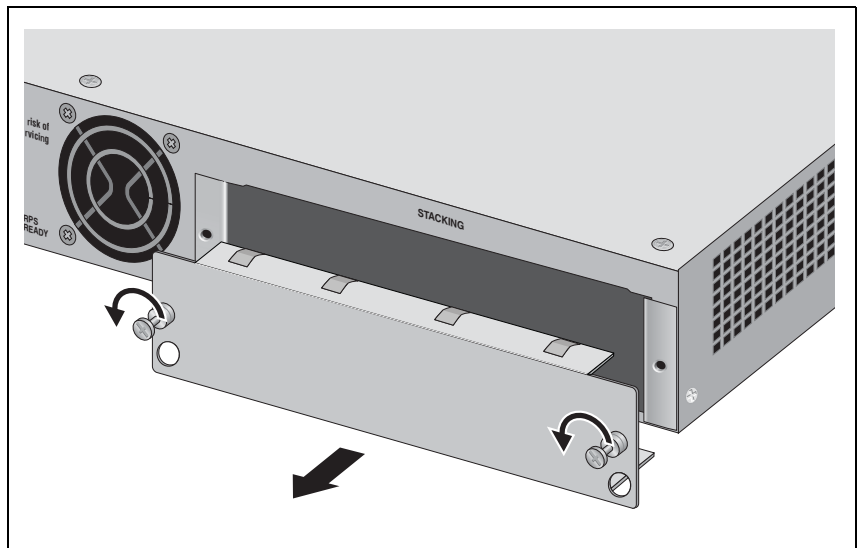


Figure 41. Removing the Blank Panel from the Expansion Slot

Note

All x610 Series Layer 3 Switch models, except the x610-48Ts/X and x610-48Ts/X-POE+, are shipped from the factory with a blank panel installed in the rear panel expansion slot. The x610-48Ts/X and x610-48Ts/X-POE+ are shipped from the factory with an AT-LBM module installed.

Note

Do not remove the blank panel from the chassis until you are ready to install a module. An open slot allows dust to enter the unit and reduces proper airflow and cooling.

3. Align the edges of either the AT-StackXG or AT-x6EM/XS2 stacking module with the guides in the slot and carefully slide the module into the chassis until it is flush with the rear panel of the chassis, as shown in Figure 42 and Figure 43. Light pressure may be needed to seat the module on the connector on the rear panel of the chassis.



Caution

Do not force the VCStack stacking module into place. Doing so may damage the connector pins on the backplane inside the chassis. If there is resistance, remove the module and reinsert it after verifying that the edges of the card are properly aligned in the guides in the chassis' module slot.

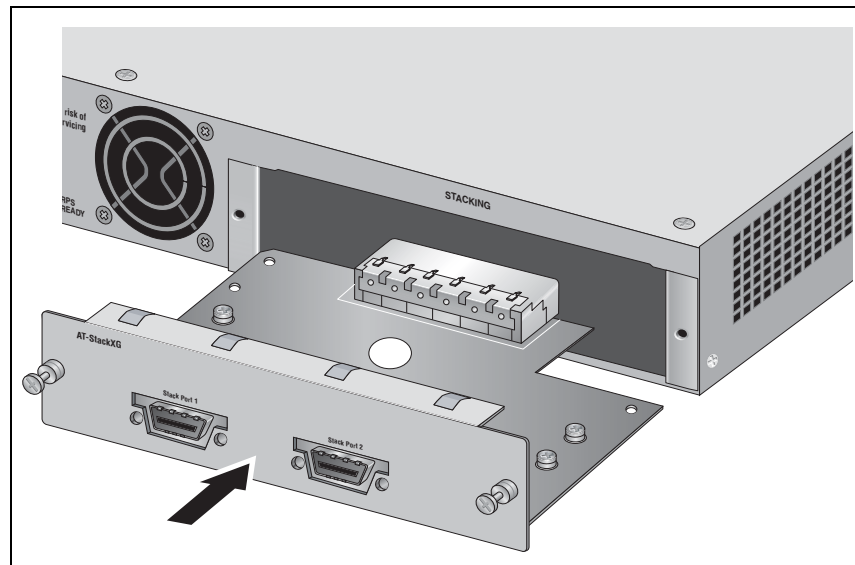


Figure 42. Installing the AT-StackXG Stacking Module

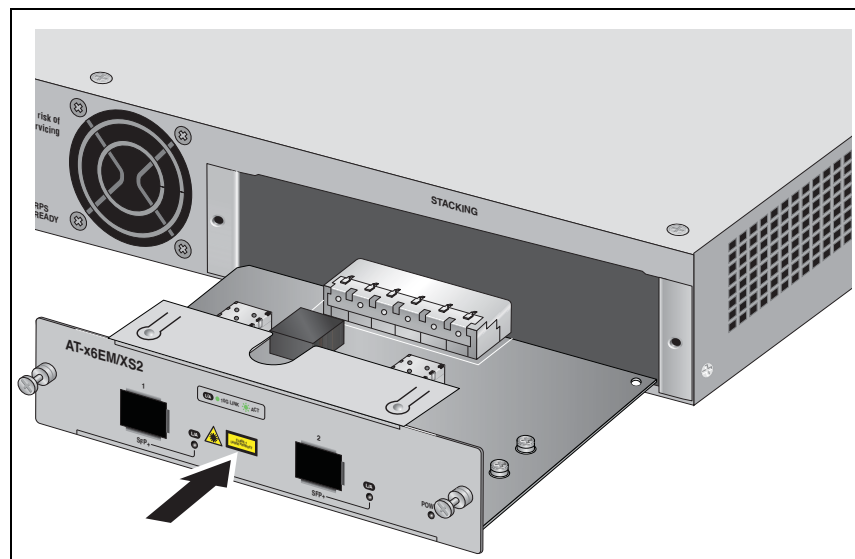


Figure 43. Installing the AT-x6EM/XS2 Stacking Module

4. Secure either the AT-StackXG or AT-x6EM/XS2 stacking module to the chassis by tightening the two captive screws with a cross-head screwdriver, as shown in Figure 44 and Figure 45.

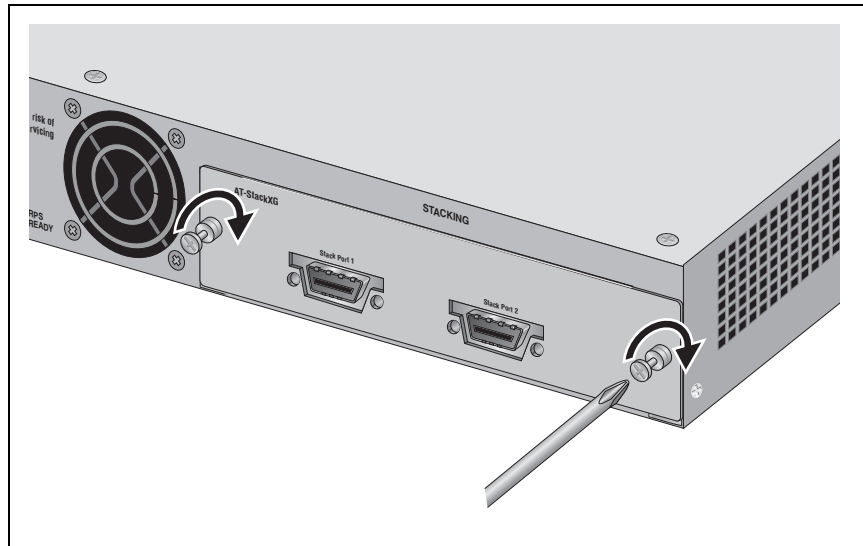


Figure 44. Securing the AT-StackXG Stacking Module

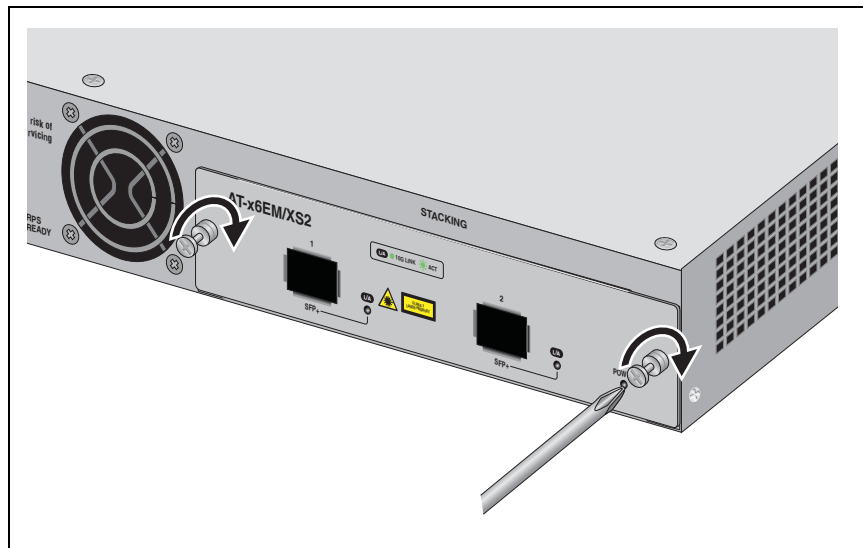


Figure 45. Securing the AT-x6EM/XS2 Stacking Module

Note

Do not cable the AT-StackXG or AT-x6EM/XS2 stacking module until you have prepared the switch's *AlliedWare Plus Operating System* software as explained in the *AlliedWare Plus Operating System Software Reference Guide*.

Cabling an AT-StackXG Stacking Module

1. Remove the plastic protector from the connector at one end of the stacking cable.

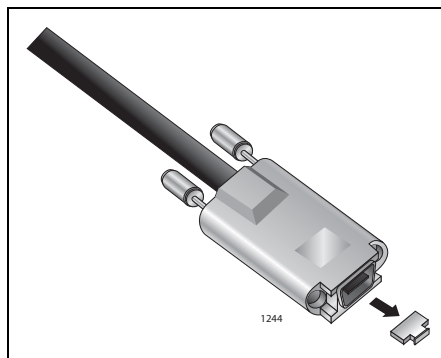


Figure 46. Removing the Plastic Protector

2. Connect the cable to either Stack Port 1 or Stack Port 2 on the stacking module and secure by tightening the two captive thumbscrews.
3. Remove the plastic protector from the connector at the other end of the stacking cable and connect it to a Stack Port on the stacking module in the next switch of the stack. A stacking cable must crossover and connect to a different port on the next stacking module. Stack Port 1 on a module must connect to Stack Port 2 on the next module.



Caution

Do not connect two stack Port 1 ports or stack Port 2 ports together.

Cabling an AT-x6EM/XS2 Stacking Module

1. Remove the dust plug from a transceiver slot on the switch, as shown in Figure 47.

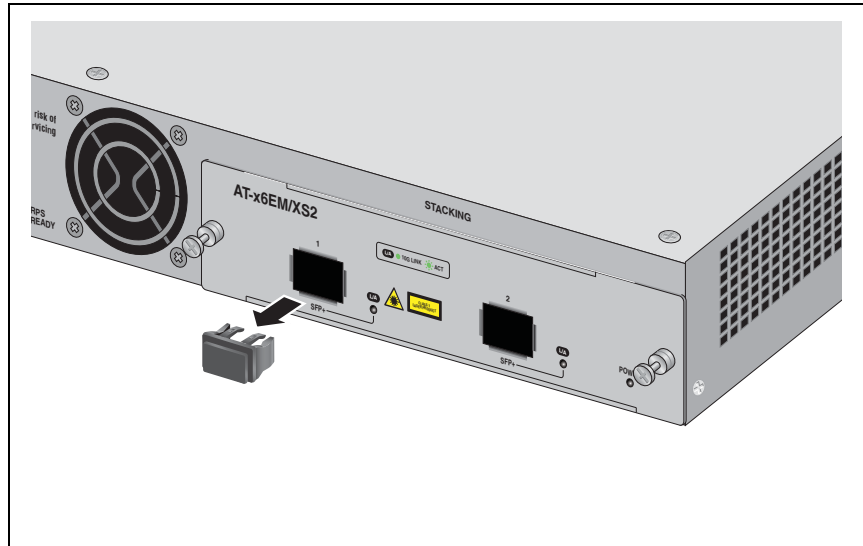


Figure 47. Removing a Dust Plug from a SFP+ Slot

2. Remove the transceiver from its shipping container and store the packaging material in a safe location.
3. Position the transceiver with the label facing up.
4. Slide the transceiver into the slot until it clicks into place, as shown in Figure 48.

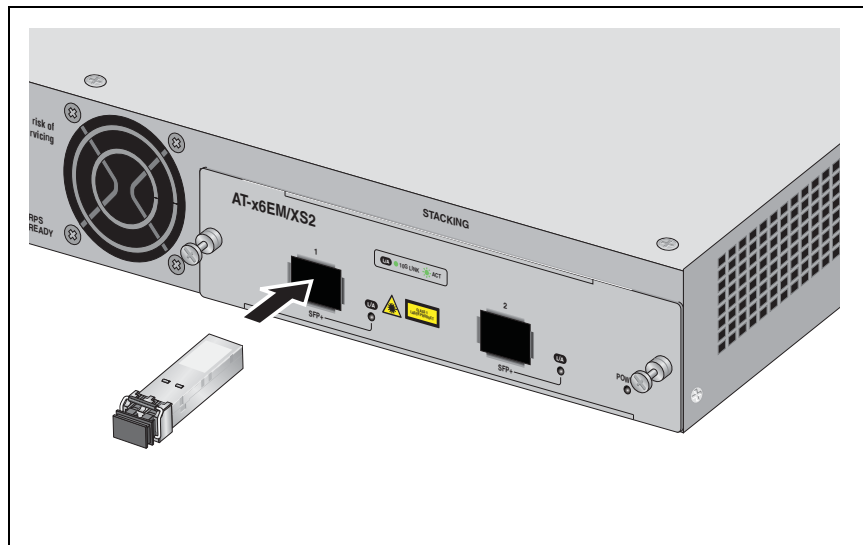


Figure 48. Installing an SFP+ Transceiver

5. Verify that the handle on the SFP+ transceiver is in the upright position, as shown in Figure 49, to prevent inadvertently removing the transceiver.

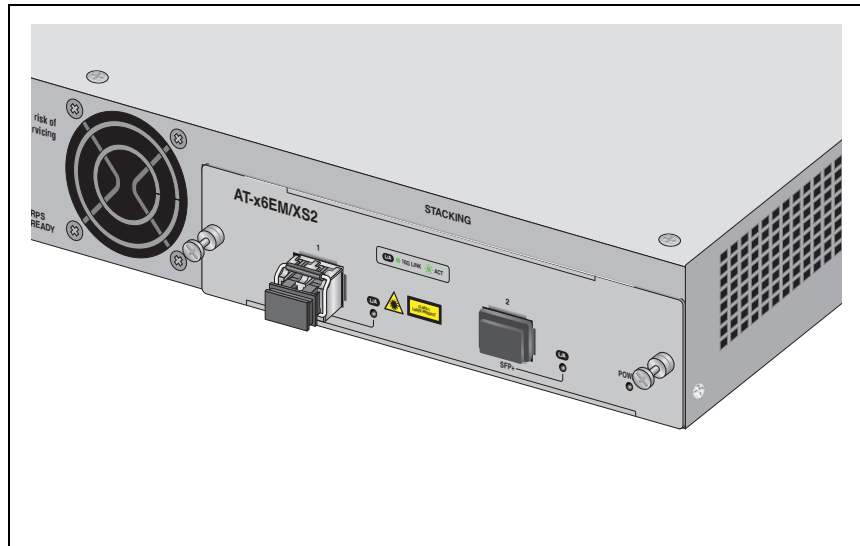


Figure 49. Positioning the SFP+ Transceiver Locking Handle

6. Remove the dust plug from the SFP+ transceiver, as shown in Figure 50.

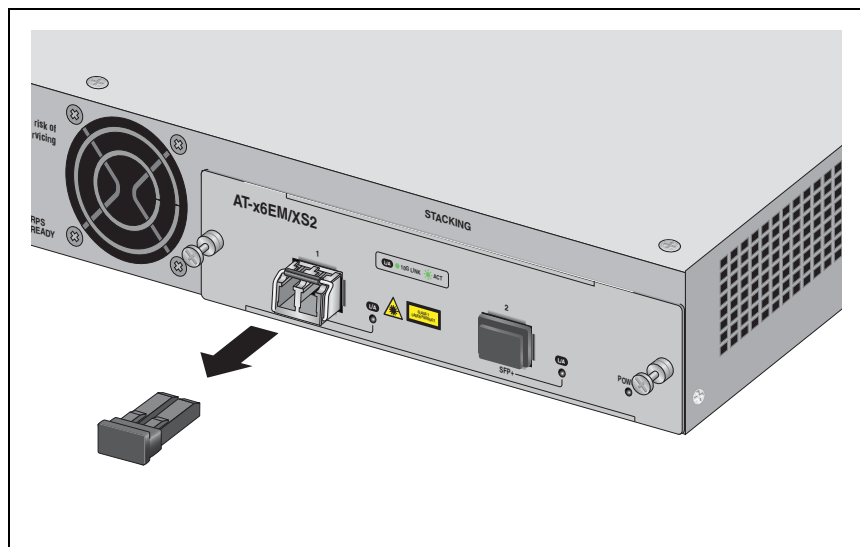


Figure 50. Removing the Dust Plug from an SFP+ Transceiver

7. Connect a cable to the SFP+ transceiver, as shown in Figure 51. For SFP+ optical and cabling specifications, consult the documentation shipped with the module.

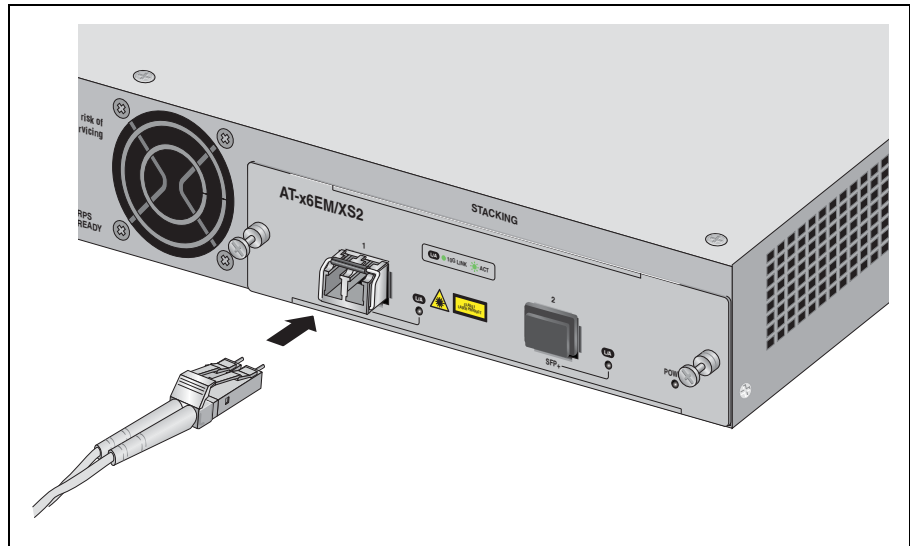


Figure 51. Connecting a Fiber Optic Cable to the SFP+ Transceiver

8. Connect the other end of the stacking cable to a Stack Port on the stacking module in the next switch of the stack. A stacking cable must crossover and connect to a different port on the next stacking module. Stack Port 1 on a module must connect to Stack Port 2 on the next module.



Caution

Do not connect two stack Port 1 ports or stack Port 2 ports together.

Chapter 4

Cabling the Network Ports

This chapter contains the instructions for attaching network cables to an x610 switch. The chapter contains the following sections:

- ❑ “Twisted Pair and Fiber Optic Specifications” on page 90
- ❑ “Installing SFP and SFP+ Transceivers” on page 92
- ❑ “Cabling the 10/100/1000Base-T and Fiber Optic Ports” on page 94
- ❑ “Powering on a Switch with a DC AT-PWR250 Power Supply Module” on page 95
- ❑ “Powering on a Switch with an AC Power Supply Module” on page 99
- ❑ “Warranty Registration” on page 102

Twisted Pair and Fiber Optic Specifications

Twisted Pair Cable Specifications

Table 17 lists the cabling specifications for the 10/100/1000Base-T twisted pair ports.

Table 17. Twisted Pair Cabling and Distances

Speed	Cable Type	Maximum Operating Distance
10 Mbps	Standard TIA/EIA 568-B-compliant Category 3 or better shielded or unshielded cabling with 100 ohm impedance and have a frequency range that extends to 16 MHz.	100 m (328 ft)
100 Mbps	Standard TIA/EIA 568-A-compliant Category 5 or TIA/EIA 568-B-compliant Enhanced Category 5 (Cat 5e) shielded or unshielded cabling with 100 ohm impedance and have a frequency range that extends to 100 MHz.	100 m (328 ft)
1000 Mbps	Standard TIA/EIA 568-A-compliant Category 5 or TIA/EIA 568-B-compliant Enhanced Category 5 (Cat 5e) shielded or unshielded cabling with 100 ohm impedance and have a frequency range that extends to 100 MHz.	100 m (328 ft)

Note

The auto-MDI/MDI-X feature on the 10/100/1000Base-T ports automatically configures the MDI/MDI-X setting when a link is established with an end node. Available when a port is at the default setting of Auto-Negotiation, this feature allows you to use a straight-through twisted pair cable when connecting any type of network device to a port.

Disabling Auto-Negotiation on a port and setting the speed and duplex mode manually also disables the auto-MDI/MDI-X feature. A port where Auto-Negotiation has been disabled defaults to MDI-X. Disabling Auto-Negotiation may require manually configuring a port's MDI/MDI-X setting or using a crossover cable.

SFP and SFP+ Transceiver Specifications

The specifications for optional SFP and SFP+ transceivers can be found on our Allied Telesis web site at **www.alliedtelesis.com**.

Installing SFP and SFP+ Transceivers

Review the following guidelines before installing an optional SFP or SFP+ transceiver in a switch:

- ❑ A transceiver can be hot-swapped; the switch can be powered on when you install it. However, you should always disconnect the cables first before removing a transceiver.
- ❑ You must install the transceiver before you connect the cables to it.
- ❑ Fiber optic transceivers are dust sensitive. When a fiber optic cable is not installed, or when you store the transceiver, always keep the plug in the optical bores. When you do remove the plug, keep it for future use.
- ❑ Unnecessary removal and insertion of a transceiver can lead to premature failure.



Warning

A transceiver can be damaged by static electricity. Be sure to observe all standard electrostatic discharge (ESD) precautions, such as wearing an antistatic wrist strap, to avoid damaging the device.

The procedure to install SFP and SFP+ transceivers is the same. The following instructions describe how to install an SFP transceiver in an x610 switch:

1. Remove the dust plug from a transceiver slot on the switch, as shown in Figure 52.

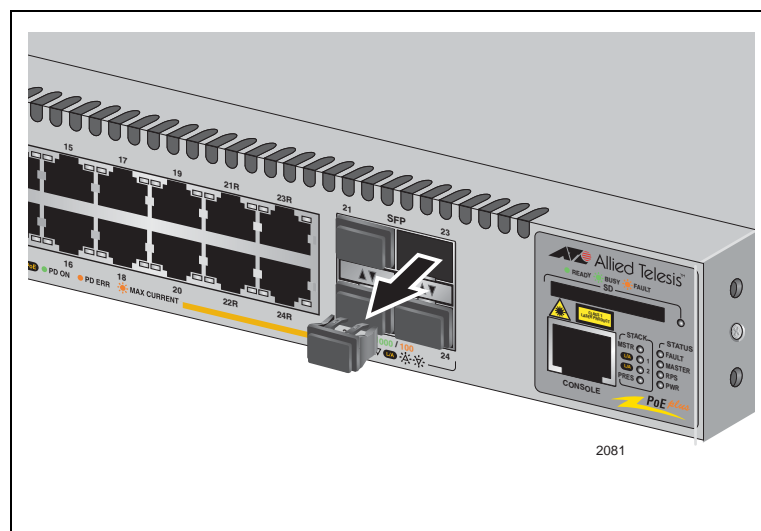


Figure 52. Removing a Dust Plug from a SFP Slot

2. Remove the transceiver from its shipping container and store the packaging material in a safe location.
3. Position the transceiver with the label facing up if installing in a top slot and with the label facing down if installing in a bottom slot.
4. Slide the transceiver into the slot until it clicks into place, as shown in Figure 53.

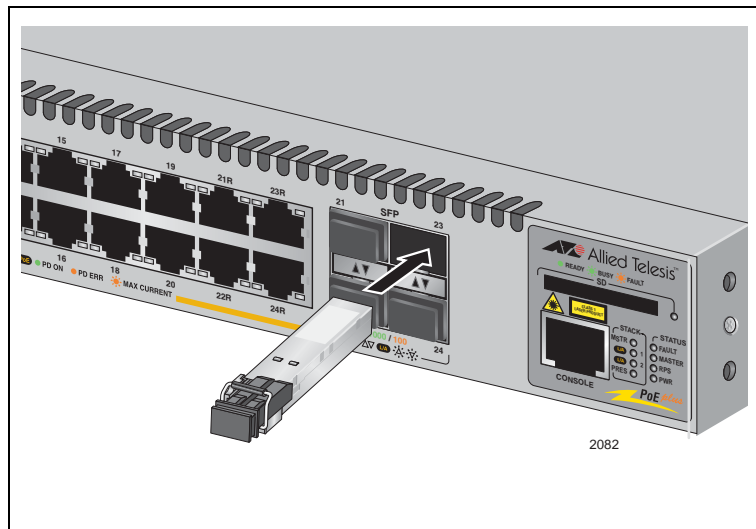


Figure 53. Installing a Transceiver

5. Repeat this procedure to install additional SFP or SFP+ transceivers or go to “Cabling the 10/100/1000Base-T and Fiber Optic Ports” on page 94.

For SFP optical and cabling specifications, consult the documentation shipped with the module.

Cabling the 10/100/1000Base-T and Fiber Optic Ports

Observe the following guidelines when connecting a twisted pair or fiber optic cable to a port on the switch:

- ❑ The connector on the cable should fit snugly into the port on the switch. The tab on the connector should lock the connector into place.
- ❑ Because the 10/100/1000Base-T ports on the switch are auto-MDI/MDI-X, any type of network device can be connected to a port on the switch using a straight-through twisted pair cable. If you disable Auto-Negotiation on the port, the port defaults to MDI-X.
- ❑ If your network topology contains a loop where two or more network devices can communicate with each other over more than one network path, make sure that your switch is properly configured with the appropriate protocol(s); i.e., STP, ESPR, LACP, etc. Data loops without these protocols enabled can adversely affect network performance.
- ❑ In order for a switch port to successfully Auto-Negotiate its duplex mode with an end node, the end node should also be using Auto-Negotiation. Otherwise, a duplex mode mismatch can occur. A switch port using Auto-Negotiation defaults to half-duplex if it detects that the end node is not using Auto-Negotiation. This can result in a mismatch if the end node is operating at a fixed duplex mode of full-duplex.

To avoid this problem, disable Auto-Negotiation on a switch port and set the port's speed and duplex mode manually if the end node has a fixed duplex mode of full-duplex.

Powering on a Switch with a DC AT-PWR250 Power Supply Module

To power on a switch with a DC AT-PWR250 Power Supply Module, perform the following procedure:



Warning

As a safety precaution, install a circuit breaker with a minimum value of 15 Amps between the equipment and the DC power source.

E9



Warning

Always connect the wires to the LAN equipment first before you connect the wires to the circuit breaker. Do not work with HOT feeds to avoid the danger of physical injury from electrical shock. Always be sure that the circuit breaker is in the OFF position before connecting the wires to the breaker. *E9*



Warning

For centralized DC power connection, install only in a restricted access area. *E23*

Note

A tray cable is required to connect the power source if the unit is powered by centralized DC power. The tray cable must be a UL listed Type TC tray cable and rated at 600 V and 90 degrees C, with three conductors, minimum 14 AWG. *E24*

1. Power off the DC circuit to be used for the chassis.
2. Verify that the On/Off switch on the DC AT-PWR250 Module is in the Off position.
3. Use the legend above the terminal block to identify the terminals. The terminals are **positive**, **power supply ground** and **negative**, from left to right, as shown in Figure 54 on page 96.

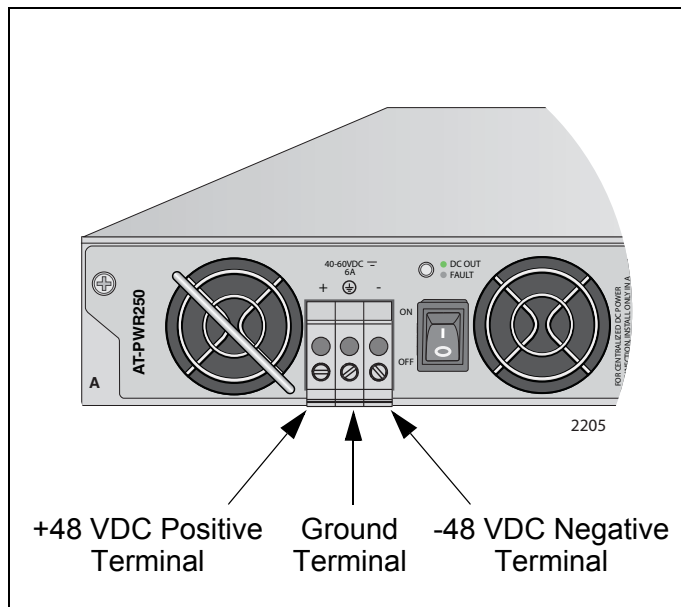


Figure 54. DC Terminal Block on the DC AT-PWR250 Power Supply Module

4. With a 14-gauge wire-stripping tool, strip the three wires in the tray cable coming from the DC input power source to $8\text{mm} \pm 1\text{mm}$ ($0.31\text{ in.} \pm 0.039\text{ in.}$), as shown in Figure 55 on page 96.



Warning

Do not strip more than the recommended amount of wire. Stripping more than the recommended amount can create a safety hazard by leaving exposed wire on the terminal block after installation. *E10*

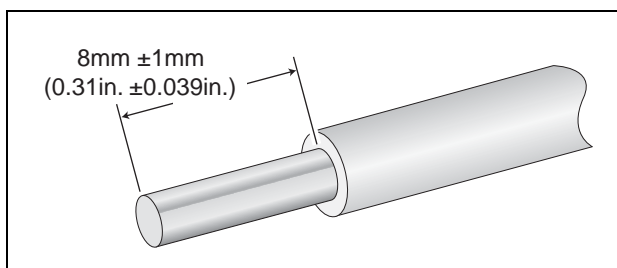


Figure 55. Stripped Wire

5. Insert the power supply ground wire into the middle connector of the DC terminal and tighten the connection with a flathead screwdriver, as shown in Figure 56 on page 97.

**Warning**

When installing this equipment, always ensure that the power supply ground connection is installed first and disconnected last. *E11*

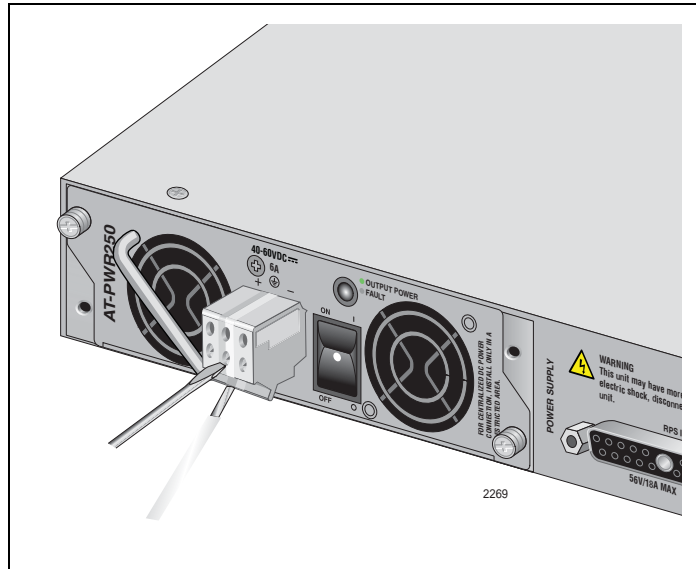


Figure 56. Inserting Wires into a DC Terminal Block

6. Connect the +48 VDC (RTN) feed wire to the terminal block marked + (plus).
7. Connect the -48 VDC feed wire to the terminal block marked - (minus).

**Warning**

Check to see if there are any exposed copper strands coming from the installed wires. When this installation is done correctly there should be no exposed copper wire strands extending from the terminal block. Any exposed wiring can conduct harmful levels of electricity to persons touching the wires. *E12*

8. Secure the tray cable near the rack framework using multiple cable ties to minimize the chance of the connections being disturbed by casual contact with the wiring. Use at least four cable ties, separated 100mm (4 in.) apart. Locate the first one within 150mm (6 in.) of the terminal block.

Note

This system will work with a positive grounded or negative grounded DC system. *E13*

9. Verify that the circuit breaker is in the Off position.

10. Connect the supply-cable wires to the circuit breaker.
11. Energize the circuit breaker.
12. Turn the power supply module's On/Off switch to On.
13. Start a local management session on the unit by performing the procedure "Starting a Local Management Session" on page 101.



Warning

This unit might have more than one power source. To reduce the risk of electric shock, disconnect all power cords before servicing the unit. ⚡ E30

Powering on a Switch with an AC Power Supply Module

To power on a switch with an AC Power Supply Module, perform the following procedure:

1. Position the power cord retaining clip in the up position, as shown in Figure 57. Note that the AT-PWR1200 power supply does not have a retaining clip.

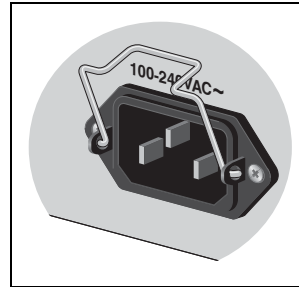


Figure 57. Power Cord Retaining Clip in the Up Position

2. Plug the power cord into the AC power connector on the rear panel of the unit, as shown in Figure 58. Lower the power cord retaining clip to secure the power cord to the unit.



Warning: Power cord is used as a disconnection device. To de-energize equipment, disconnect the power cord. ⚡ E3

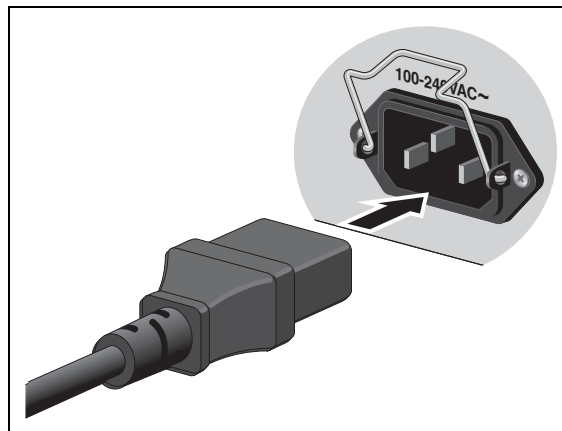


Figure 58. Connecting the AC Power Cord

3. Connect the other end of the power cord to an appropriate AC power outlet. For power specifications for the switch, refer to “Power Specifications” on page 114.

Note

For countries that require 100-125 VAC installations, the power cord plug provided with the AT-PWR1200 power supply has a 20 Amp, 125 V NEMA 5-20P plug. This plug is only compatible with a NEMA 5-20R receptacle. See Figure 59.

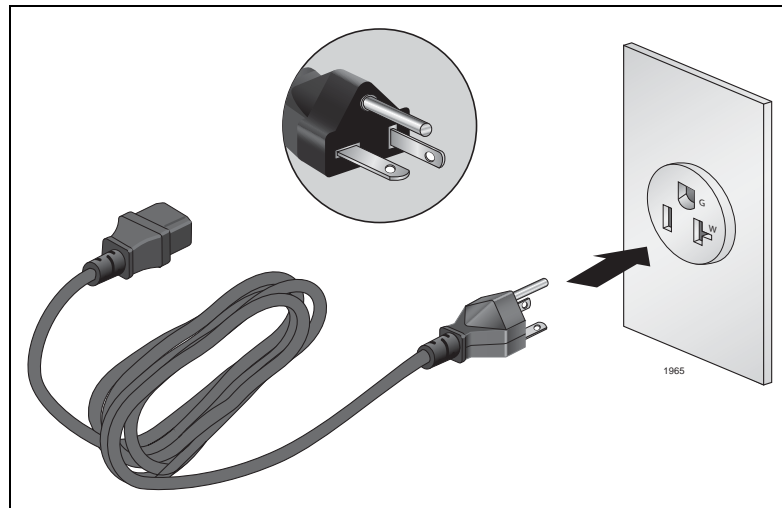


Figure 59. 100-125 VAC 125 V NEMA 5-20 Plug and Receptacle



Warning

This unit might have more than one power supply. To reduce the risk of electric shock, disconnect all power cords before servicing the unit. ⚡ E30

4. Start a local management session on the unit by performing the next procedure.

Starting a Local Management Session

The following procedure describes how to connect an RJ-45 cable to an x610 switch. For information about how to log onto the *AlliedWare Plus Operating System Software*, see the *AlliedWare Plus Operating System Software Reference Guide*.

To start a local management session on the unit, perform the following procedure:

1. Connect the RJ-45 end of the management cable included with the x610 switch to the Terminal Port on the front panel of the switch, as shown in Figure 60.

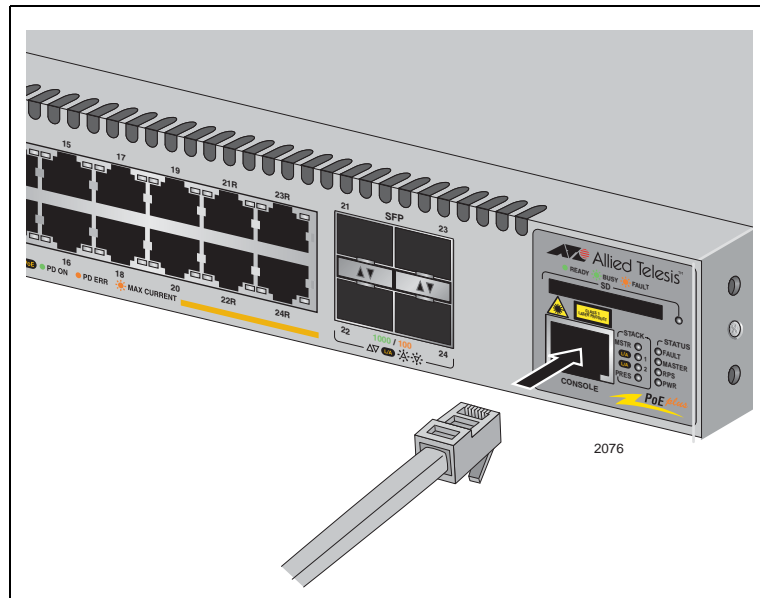


Figure 60. Connecting the Management Cable to the RJ-45 Terminal Port on the Switch

2. Connect the other end of the cable to an RS-232 port on a terminal or a personal computer with a terminal emulation program.
3. Configure the terminal or terminal emulation program as follows:
 - ☐ Baud rate: Default is 9600 bps (Range is 9600 to 115200 bps)
 - ☐ Data bits: 8
 - ☐ Parity: None
 - ☐ Stop bits: 1
 - ☐ Flow control: None

Note

The port settings are for a DEC VT100 or ANSI terminal, or an equivalent terminal emulator program.

Warranty Registration

For warranty information and registration, go to the Allied Telesis web site at **www.alliedtelesis.com/support/warranty**.

Chapter 5

Troubleshooting

This chapter contains information about how to troubleshoot a switch in the event a problem occurs. Sections in the chapter include:

- ❑ “Power LED is Off” on page 104
- ❑ “Twisted Pair Port Link LED is Off” on page 105
- ❑ “SFP or SFP+ LED is Off” on page 106
- ❑ “Transceiver is Installed but the Status is “Not Present”” on page 107
- ❑ “System Fault LED is Blinking” on page 108
- ❑ “System Fault LED is Steadily On” on page 109
- ❑ “Cannot Establish a Local (Out-of-Band) Management Session” on page 110
- ❑ “Switch Functions Intermittently” on page 111
- ❑ “Issues with Virtual Stacking Chassis Configuration” on page 112

Note

If you are unable to resolve the problem after following the instructions in this chapter, contact Allied Telesis Technical Support for assistance. Refer to “Contacting Allied Telesis” on page 18 for contact information.

Power LED is Off

Check the PWR LED on the front of the switch. If the LED is off, indicating that the unit is not receiving power, do the following:

- ❑ Make sure the power cord is securely connected to the power source and to the AC connector on the rear panel of the switch.
- ❑ Verify that the power outlet has power by connecting another device to it.
- ❑ Connect the unit to another power source.
- ❑ Use a different power cord.
- ❑ Check that the voltage from the power source is within the required levels for your region.

Twisted Pair Port Link LED is Off

When a twisted pair port on the switch is connected to a properly operating end node, the Link LED for the port should be on. If a Link LED is off, do the following:

Note

A 1000Base-T connection can take from five to ten seconds to establish a link.

- ❑ Verify that the end node connected to the port is powered ON and is operating properly.
- ❑ Check that the twisted pair cable is securely connected to the port on the switch and to the port on the end node.
- ❑ Make sure that the twisted pair cable does not exceed 100m (328 ft).
- ❑ Verify that you are using the appropriate category of twisted pair cable. For information, refer to Table 17 on page 90.
- ❑ Determine if a crossover cable is required. Since the twisted pair ports feature auto MDI/MDI-X, you should be able to use a straight-through cable regardless of the type of device you connect to a port. However, if you disable Auto-Negotiation on a port and set a port's speed and duplex mode manually, the port defaults to MDI-X. Disabling Auto-Negotiation may require manually configuring a port's MDI/MDI-X setting or using a crossover cable.
- ❑ Make sure that the operating parameters of a port on the switch are compatible with the end node to which the port is connected. This may require using the switch's operating system software.
- ❑ For a switch port to successfully Auto-Negotiate its duplex mode with an end node, the end node should also be using Auto-Negotiation. Otherwise, a duplex mode mismatch can occur. A switch port using Auto-Negotiation defaults to half-duplex if it detects that the end node is not using Auto-Negotiation. This can result in a mismatch if the end node is operating at a fixed duplex mode of full-duplex.

To avoid this problem, disable Auto-Negotiation on a switch port and set the port's speed and duplex mode manually if the end node has a fixed duplex mode of full-duplex.

- ❑ The switch has a bad cable detection feature that enables it to determine if a twisted pair cable has a electrical short that might cause a network loop. If the switch detects a bad cable on a port, it does not establish a link on that port. In this situation, replace the cable.

SFP or SFP+ LED is Off

When a fiber optic port on the switch is connected to a properly operating end node, the Link LED for the port should be on. If a Link LED is off, do the following:

- ❑ Verify that the end node connected to the port is powered ON and is operating properly.
- ❑ Check that the fiber optic cable is securely connected to the port on the switch and the port on the end node.
- ❑ If the fiber optic port is on a SFP or SFP+ transceiver, check that the transceiver is firmly inserted into the slot on the switch.
- ❑ Make sure that you are using the appropriate type of fiber optic cable and that the cable length does not exceed the allowed maximum distance. For cable specifications for an SFP transceiver, refer to the installation instructions shipped with the module.
- ❑ Use a fiber optic tester to test the attenuation on the cable and the strength of the optical signal. For operating specifications for an SFP transceiver, refer to the installation instructions shipped with the module.
- ❑ Check that the operating specifications (for instance, wavelength and maximum operating distance) of the fiber optic port on the remote end node are compatible with the fiber optic port on the switch.
- ❑ Check that the fiber optic ports on the switch and on the end node are operating at the same speed and duplex mode.
- ❑ A fiber optic cable contains two separate fiber strands. One strand is for receiving data and the other is for transmitting data. When you connect a fiber optic cable to a port, be sure that the receive fiber connector is connected to the transmit connector on the remote end node. In addition, check that the transmit fiber connector is connected to the receive connector on the remote node.

Note

The L/A LED for an SFP transceiver slot may remain ON if you remove the transceiver when it has a link to an end node without first disconnecting the fiber optic cable. The L/A LED will change to OFF the next time an SFP module is installed in the slot. To avoid this, always disconnect the fiber optic cable before removing a transceiver.

Transceiver is Installed but the Status is “Not Present”

If a SFP or SFP+ transceiver is installed in a transceiver slot but the Uplink Information menu in the *AlliedWare Plus Operating System Software* interface displays “Not Present” for that port, do the following:

- ❑ Verify that the transceiver is completely inserted in the slot on the front of the switch.

Note

The uplink status does not reflect whether a fiber optic cable is connected to the transceiver.

System Fault LED is Blinking

A blinking FAULT LED indicates that the switch is updating the active boot configuration file or a new version of the operating system software is in the process of being downloaded to the switch. The LED stops blinking after the switch has completed updating the boot configuration file or downloading the operating system software.

System Fault LED is Steadily On

If the system FAULT LED is steadily on, a problem has occurred in the switch. Do the following:

- ❑ Reset the switch by disconnecting and reconnecting the AC power cord.
- ❑ If the FAULT LED remains ON, download a new version of the switch's operating system software. For instructions, refer to the *AlliedWare Plus Operating System Software Reference Guide*.

Note

If the FAULT LED remains steadily on, contact Allied Telesis Technical Support for assistance. See "Contacting Allied Telesis" on page 18.

Cannot Establish a Local (Out-of-Band) Management Session

If you are unable to establish a local (out-of-band) management session with the switch through the terminal port on the front panel, do the following:

- ❑ Check that the RJ-45 serial management cable is securely connected to the serial terminal port on the switch and to the RS-232 port on the terminal or personal computer.
- ❑ Check that the operating parameters on the terminal or the terminal emulation program have been set correctly. The default settings for the RJ-45 serial terminal port can be found in “Powering on a Switch with a DC AT-PWR250 Power Supply Module” on page 95.

Switch Functions Intermittently

If a switch functions intermittently, check the system hardware status through the management interface:

- ❑ Note the current voltage for the power supply compared to the optimum rating.
- ❑ Verify that the system temperature is within the operating range.

Issues with Virtual Stacking Chassis Configuration

For information on issues with stacking, refer to the Allied Telesis Inc. website (www.alliedtelesis.com) for the *Overview of Virtual Chassis Stacking (VCS)* and the Virtual Chassis Stacking section of the *AlliedWare Plus Operating System Software Reference Guide*.

Appendix A

Technical Specifications

Physical Specifications

Dimensions (H x W x D):

x610-24Ts	44 mm x 440 mm x 419 mm (1.72 in. x 17.34 in. x 16.5 in.)
x610-24Ts/X	44 mm x 440 mm x 419 mm (1.72 in. x 17.34 in. x 16.5 in.)
x610-48Ts	44 mm x 440 mm x 419 mm (1.72 in. x 17.34 in. x 16.5 in.)
x610-48Ts/X	44 mm x 440 mm x 419 mm (1.72 in. x 17.34 in. x 16.5 in.)
x610-24Ts-POE+	44 mm x 440 mm x 419 mm (1.72 in. x 17.34 in. x 16.5 in.)
x610-24Ts/X-POE+	44 mm x 440 mm x 419 mm (1.72 in. x 17.34 in. x 16.5 in.)
x610-48Ts-POE+	44 mm x 440 mm x 419 mm (1.72 in. x 17.34 in. x 16.5 in.)
x610-48Ts/X-POE+	44 mm x 440 mm x 419 mm (1.72 in. x 17.34 in. x 16.5 in.)

Weight:

x610-24Ts	8.75 kg (19.30 lb.)
x610-24Ts/X	9.67 kg (21.31 lb.)
x610-48Ts	8.96 kg (19.75 lb.)
x610-48Ts/X	9.80 kg (21.60 lb.)
x610-24Ts-POE+	7.57 kg (16.70 lb.)
x610-24Ts/X-POE+	7.60 kg (16.75 lb.)
x610-48Ts-POE+	7.82 kg (17.25 lb.)
x610-48Ts/X-POE+	8.50 kg (18.74 lb.)

Recommended Minimum
Ventilation on Front and Back Sides: 100 mm (4.0 in)

Environmental Specifications

Operating Temperature:	0° C to 40° C (32° F to 104° F)
Storage Temperature:	-20° C to 60° C (-4° F to 140° F)
Operating Humidity:	5% to 80% noncondensing
Storage Humidity:	5% to 95% noncondensing
Maximum Operating Altitude:	3,048 m (10,000 ft)
Maximum Nonoperating Altitude:	4,000 m (13,100 ft)

Power Specifications

Table 18. Maximum Power Consumption at Power Supply Output (in Watts)

	AT-PWR250			AT-PWR800			AT-PWR1200		
	Switch	PoE+	Total	Switch	PoE+	Total	Switch	PoE+	Total
x610-24Ts	70 W	-	70 W	70 W	-	70 W	70 W	-	70 W
x610-24Ts/X	75 W	-	75 W	75 W	-	75 W	75 W	-	75 W
x610-48Ts	95 W	-	95 W	95 W	-	95 W	95 W	-	95 W
x610-48Ts/X	100 W	-	100 W	100 W	-	100 W	100 W	-	100 W
x610-24Ts-POE+	70 W	-	70 W	70 W	480 W	550 W	70 W	720 W	790 W
x610-24Ts/X-POE+	75 W	-	75 W	75 W	480 W	555 W	75 W	720 W	795 W
x610-48Ts-POE+	95 W	-	95 W	95 W	480 W	575 W	95 W	780 W	875 W
x610-48Ts/X-POE+	100 W	-	100 W	100 W	480 W	580 W	100 W	780 W	880 W

Input Voltage:

AC Input (Non-POE Models)	100-240V AC, 2.0 A maximum, 50/60 Hz
AT-PWR250 Module - AC	100-240 VAC, 5 A maximum, 50/60 Hz
AT-PWR250 Module - DC	40-60 VDC VAC, 6 A maximum
AT-PWR800 Module	100-240 VAC, 12 A maximum, 50/60 Hz
AT-PWR1200 Module	100-240 VAC, 16 A maximum, 50/60 Hz

PoE and PoE+ Output Voltage:

DC Output	56V DC, 10-600 mA
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Certifications

EMI (Emissions):	FCC Class A, ICES-003 Class A, EN55022 Class A, EN61000-3-2, EN61000-3-3, VCCI Class A, C-TICK, CE	
EMC (Immunity):	EN55024	
Electrical and Laser Safety:	EN60950-1 (TUV), EN60825-1 (TUV), UL 60950-1 (CULUS), CSA-C22-2 No. 60950-1 (CULUS)	
Quality and Reliability (MTBF):	x610-24Ts	80,000 hrs.
	x610-24Ts/X	80,000 hrs.
	x610-48Ts	70,000 hrs.
	x610-48Ts/X	60,000 hrs.
	x610-24Ts-POE+	160,000 hrs.
	x610-24Ts/X-POE+	150,000 hrs.
	x610-48Ts-POE+	120,000 hrs.
	x610-48Ts/X-POE+	120,000 hrs.
Compliance Marks:	CE, CULUS, TUV, C-Tick	

RJ-45 Twisted Pair Port Pinouts

Figure 61 illustrates the pin layout of an RJ-45 connector and port.

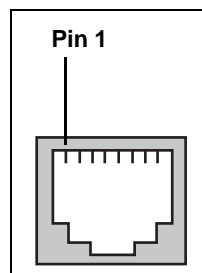


Figure 61. RJ-45 Connector and Port Pin Layout

Table 19 lists the pin signal definitions when a port is operating in the MDI configuration at 10 or 100 Mbps.

Table 19. MDI Pin Signals - 10 or 100 Mbps

Pin	Signal
1	TX+
2	TX-
3	RX+
6	RX-

Table 20 lists the pin signal definitions when a port is operating in the MDI-X configuration at 10 or 100 Mbps.

Table 20. MDI-X Pin Signals - 10 or 100 Mbps

Pin	Signal
1	RX+
2	RX-
3	TX+
6	TX-

The MDI/MDI-X setting is established automatically when a port is set to Auto-Negotiation. If a port's speed and duplex are set manually, the MDI/MDI-X setting defaults to the MDI-X setting.

Table 21 lists the pin signal definitions when a port operating at 1000 Mbps.

Table 21. Pin Signals - 1000 Mbps

Pinout	Pair
1	Pair 1 +
2	Pair 1 -
3	Pair 2 +
4	Pair 3 +
5	Pair 3 -
6	Pair 2 -
7	Pair 4 +
8	Pair 4 -

RJ-45 Style Serial Terminal Port Pinouts

Table 22 lists the pin signal definitions on the RJ-45 style serial terminal port.

Table 22. RJ-45 Style Serial Terminal Port Pin Signals

Pin	Signal
1	Request to Send
2	Data Terminal Ready
3	Transmit Data
4	Data Carrier Detect
5	Ground
6	Receive Data
7	Data Set Ready
8	Clear to Send

AT-RPS3000 21-pin Connector Pinouts

Figure 62 illustrates the pin layout of the RPS 21-pin D-combo port and connector used to connect the AT-RPS3000 Redundant Power Supply to x610 Series Switches.

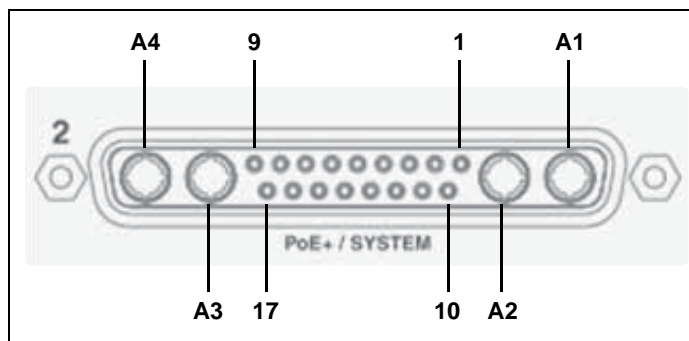


Figure 62. AT-RPS3000 21-Pin Connector Layout

Table 23 lists the RPS 21-pin D-combo port and connector pinout definitions.

Table 23. AT-RPS3000 21-Pin Connector Pinout Definitions

Pin	Definition
A1	12V Return
A2	12V Power Contact
A3	56V Power Contact (for PoE Ready port only)
A4	56V Return (for PoE Ready port only)
1	12V Positive Remote Sense
2	Reserved
3	RPS3000 Status
4	Reserved
5	12V Negative Remote Sense
6	RPS Power Good. Active high, from RPS to switch. This signal is floating when cable is not connected.
7	Reserved
8	56V Load Share (for PoE Ready port only)
9	56V Positive Remote Sense (for PoE Ready port only)
10	Tied to ground inside RPS
11	Switch power good indication. Active high input from switch to RPS. This signal is floating when cable is not connected.
12	Reserved
13	Extra PoE power available. Active high, from RPS to switch.
14	Reserved
15	Tied to ground inside switch
16	Reserved
17	56V Negative Remote Sense (for PoE Ready port only)

